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MACKENZIE VALLEY PIPELINE INQUIRY

IN THE MATTER OF APPLICATIONS BY EACH OF
(a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A
RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS
CROWN LANDS WITHIN THE YUKON TERRITORY AND
THE NORTHWEST TERRITORIES; and
(b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY
THAT MIGHT BE GRANTED ACROSS CROWN LANDS
WITHIN THE NORTHWEST TERRITORIES,
FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND
ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION,
OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE
PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

January 16, 1976.

PROCEEDINGS AT INQUIRY

Volume 111

CANADIAN ARCTIC
GAS STUDY LTD.

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APPEARANCES:

Mr. Ian G. Scott, Q.C.,
Mr. Stephen T. Goudge,
Mr. Alick Ryder and
Mr. Ian Roland for Mackenzie Valley Pipeline
Inquiry;

Mr. Pierre Genest, Q.C.,
Mr. Jack Marshall, and
Mr. Darryl Carter for Canadian Arctic Gas
Pipeline Limited;
Mr. Reginald Gibbs, Q.C.,
Mr. Alan Hollingworth &
Mr. John W. Lutes, for Foothills Pipe Lines Ltd.;

Mr. Russell Anthony &
Pro. Alastair Lucas for Canadian Arctic Resources
Committee;

Mr. Glen W. Bell and
Mr. Gerry Sutton, for Northwest Territories
Indian Brotherhood, and
Metis Association of the
Northwest Territories;

Mr. John Bayly
or
Miss Leslie Lane for Inuit Tapirisat of Canada,
and The Committee for
Original Peoples Entitle-
ment;

Mr. Ron Veale and
Mr. Allen Lueck for The Council for the Yukon
Indians;

Mr. Carson H. Templeton, for Environment Protection
Board;

Mr. David Reesor for Northwest Territories
Association of Municipal-
ities;

Mr. Murray Sigler for Northwest Territories
Chamber of Commerce.

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Calef, Lent, Bergerud
Cross-Exam by Carter

Yellowknife, N.W.T.

January 16, 1976.

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

THE COMMISSIONER: Well, we'll
come to order, Mr. Carter.

GEORGE WALLER CALEF
PETER CHARLES LENT
ARTHUR THOMPSON BERGERUD
resumed:

CROSS-EXAMINATION BY MR. CARTER (CONTINUED):

Q Dr. Calef, in your
evidence I took it that one of your main points was
that you could use the same data as Mr. Jakimchuk, for
example, and come up with different conclusions. Is
that a fair assessment?

WITNESS CALEF: Yes, I think
that's what I did.

Q So you accept the data
collected by the Renewable Resources on the movements
of the caribou herd, for example.

A Certainly.

Q And you've reviewed their
reports on that in the Biological Report series.

A I believe that I have
reviewed the work in the Biological Report series.
I think the last year of research that I am familiar
with is 1974. Is there anything published on anything
after 1974?

Q I don't think so. I don't
think 1975 is published yet, but in any case you

Calef, Lent, Bergerud
Cross-Exam by Carter

1 reviewed it up till 1974.

2 A I believe so, yes.

3 Q I wonder if I could refer
4 you to at least some maps in the Biological Report
5 series and ask you to comment on them then, and the
6 first one is in Volume 4, and perhaps you might wish
7 to refer to this as well, Mr. Commissioner, and I'll
8 ask Miss Hutchinson to give that to you. The map
9 I'm referring to is the map following page 22 entitled:
10 "Summer movements, Porcupine caribou herd, 1971."

11 A Yes.

12 Q Now, Dr. Calef, looking
13 at this map you'll see toward the bottom two arrows and
14 on the right-hand side, July 27th to 31st, and then over
15 on the left-hand side August 2nd, and the number 60,000.
16 Would you disagree with the information contained on
17 that map?

18 A No, I guess not.

19 MR. ANTHONY: Could you just
20 assist me? I don't have a copy of that map. Could you
21 tell me what that indicates, 60,000 caribou in that
22 direction, is that --

23 MR. CARTER: That's what it
24 indicates, yes.

25 Q And you will see the
26 line on the map running through that area and that would
27 be the interior route alignment, would it not?

28 A Yes.

29 Q Now --

30 THE COMMISSIONER: Excuse me,

Calef, Lent, Bergerud
Cross-Exam by Carter

1 just stop for a minute, there's some technical problem.
2

3 MR. CARTER: All right.

4 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)
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1 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

2 THE COMMISSIONER: Okay, carry
3 on, Mr. Carter.

4 MR. CARTER: Sir, not every-
5 one has this map and it shows the movements in 1971.
6 Perhaps what I could do is have Mr. Roseneau
7 put the slide up that Mr. Jakimchuk used earlier to
8 show these movements, and it has all of the years, or
9 at least 1971 through 1974.

10 THE COMMISSIONER: Okay.

11 MR. ANTHONY: Mr. Carter,
12 this slide is not the same as the map, but it is a
13 composite of that map and others?

14 Mr. CARTER: This was a slide
15 that Mr. Jakimchuk showed during the overview.
16 Yes, and when he was giving his testimony during
17 Phase III as well.

18 Now, during the overview
19 the slide did not have the routes marked on it because
20 Mr. Jakimchuk was presenting overview evidence. But since
21 then the routes have been marked on the slide.

22 Now, Dr. Calef, this slide
23 and you can't see it on the screen, but it is entitled
24 "Post Calving Movements and August Dispersal" and it
25 reflects the information for 1971 and 1972. Would you
26 accept the movements as they are depicted on that slide?

27 WITNESS CALEF: Yes.

28 MR. CARTER: And I wonder
29 if Mr. Roseneau could superimpose '73 and '74.

30 THE COMMISSIONER: Dr. Calef,

just -- I don't think that there is any dispute about this -- the calving grounds essentially extend along the coast and into the foothills -- I don't want to get into that particular argument at the moment, but roughly from Herschel Island to Camden Bay, would that be the extent of the calving grounds?

A I there's in many years there's a lot of calves born east of Herschel Island all the way over to as far east as the Babbage River.

THE COMMISSIONER: All right, the Babbage River is the limit of the calving grounds given earlier --

A Yes.

THE COMMISSIONER: -- and I have been along there and the Babbage, would that be the river that we see -- well, yes, maybe you could show me.

A It would be the one that goes into Mackenzie Bay there, yes, that is right.

THE COMMISSIONER: So the calving grounds really are from the Babbage right across to Camden Bay?

A Yes, I think so.

THE COMMISSIONER: It really means from Mackenzie Bay to Camden Bay --

A Right.

THE COMMISSIONER: Well, carry on, Mr. Carter.

MR. CARTER: Sir, we have a slide showing the calving grounds, maybe we could just

Calef, Lent, Bergerud
Cross-Exam by Carter

1 put that up quickly ^{to see} if Dr. Calef agrees. It shows there,
2 Dr. Calef, the calving ground from Babbage River to Camden
3 Bay, I guess, you'd agree with that?

4 A Yes.

5 THE COMMISSIONER: Sorry, just
6 while we have got this thing up here, that is your
7 slide, Mr. Jakimchuk -- were you just saying something
8 about it? You can speak from there. There is nothing
9 wrong with that.

10 MR. JAKIMCHUK: For purpose
11 of illustration, what you can't see down on the bottom
12 is that that is also a composite showing the calving
13 area in various years. The red is 1972. I believe the
14 blue is '73 and the green line is where the bulk of
15 the calving took place in '74.

16 THE COMMISSIONER: The red and
17 the green and the blue would be sort of the perimeter,
18 that's what those things are ?

19 MR. JAKIMCHUK: Yes, that is
20 correct.

21 THE COMMISSIONER: Let me
22 just --

23 MR. JAKIMCHUK: So it does
24 show the calving ground for individual years and the
25 variation that has occurred within those three years.

26 THE COMMISSIONER: What is
27 that, about 150 miles from Mackenzie Bay to Camden
28 Bay -- 200 miles.

29 WITNESS CALEF: I think that
30 it is about 200 miles.

Calef, Lent, Bergerud
Cross-Exam by Carter

THE COMMISSIONER: And the green, what was the green again? It tails off there at the Canadian border.

MR. CARTER: What year is the green? 1974 --

MR. ROSENEAU: The green is 1974, when the bulk of the calvings took place between Alaska and it is turning off into the Yukon side.

THE COMMISSIONER: Just for the record, Mr. Jakimchuk, the green is 1974 and most of the calving took place in Alaska, that is the picture.

Now, just before we leave this, Dr. Banfield isn't here, but you are Dr. Calef and you and he had this dispute about whether the calving takes place in the foothills or on the coastal plain and he said that it largely took place within the foothills. You said, maybe you would repeat now what you said.

Calef, Lent, Bergerud
Cross-Exam by Carter

We did see animals with calves right out to the edge of the coast, and it seemed like they were approximately equal numbers on both the coastal plain and the foothills. So I think there is a substantial amount of calving right on the coastal plain.

The situation may be different

Calef, Lent, Bergerud
Cross-Exam by Carter

1 in other years.

2 THE COMMISSIONER: Yes, please
3 do.

4 WITNESS LENT: I was mentioning
5 yesterday the observations of Skoog in, I don't recall
6 the exact year, it was early '60's when the bulk of
7 calving occurred from Camden Bay west to the Canning
8 River. It was between the Tutaktaruk, I believe it
9 is, and the Canning.

10 THE COMMISSIONER: Sorry,
11 between what and the Canning?

12 A Well, essentially south
13 of Camden Bay as far west as the Canning River. So
14 it would be extending a bit farther west than the
15 green area outlined on the map, and within a few miles
16 of the coast.

17 Q Do you have any observation
18 to make on this question of whether the calving itself
19 occurs on the coastal plain or within the foothills?
20 Or both?

21 A Well, I've made some
22 observations on that yesterday and suggested that it
23 varies from year to year. It does occur on both, and
24 that it seems to depend upon snow conditions and timing
25 of arrival on the calving grounds.

26 Q It depends upon snow
27 conditions and what?

28 A Timing of arrival on the
29 calving grounds.

30 Q One last thing. The

Calef, Lent, Bergerud
CrossExam by Carter

1 -- I suppose the black lines are the pipelines, I don't
2 see the Canning marked, though.

3 A It's just by that little
4 red and blue circle there.

5 Q Oh yes, of course.

6 MR. CARTER: I'm not sure, Dr.
7 Calef, whether I asked you to indicate whether or not
8 you agreed with --

9 WITNESS CALEF: Yes.

10 Q -- this slide as well.

11 A I said I assume it's
12 correct.

13 Q So looking at this -- well
14 both of these slides encompassing the years 1971
15 through '74, and the map which I showed you earlier
16 with respect to 1971, you would agree that they indicate
17 major portions of the herd crossing the interior route
18 during the August dispersal.

19 A Yes.

20 Q All right. Sir, do you want to
21 keep that map on?

22 THE COMMISSIONER:
Sure.

23 MR. CARTER:

24 Q Dr. Calef, I wonder if
25 I might refer you then to your testimony at page 13.
26 Here you're offering some criticism of Mr. Jakimchuk's
27 evidence and quote a statement of his which says:
28 (1) crosses migratory paths of spring and fall
29 migrations and summer movements.

30 Then you state,

"The assertion that the interior route crosses

Calef, Lent, Bergerud
Cross-Exam by Carter

1 the area of summer movements of any major
2 part of the Porcupine herd is untrue."

3 Bearing in mind what we have just seen with respect to
4 the August dispersal, do you still hold that Mr. Jakim-
5 chuk's statement there is untrue?

6 A I guess what we're
7 quibbling about is the definition of "summer", and I
8 guess that summer movements would not be the best term
9 for what I was talking about. I was talking about --
10 well, I assumed that Mr. Jakimchuk was talking about
11 the movements of the very large post-calving herds
12 while they are in very large herds and while they're
13 under the harassment of insects, which would be the
14 period through July, but I would not consider the
15 August dispersal as part of the summer movements. It's
16 -- well, part of the post-calving movements -- it's a
17 separate part of the life cycle.

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Calef, Lent, Bergerud
Cross-Exam by Carter

1 Q Right. Well, later on in
2 that paragraph you state:

3 "During August, the last summer month ,"
4 so you consider August a summer month.

5 A O.K., yes, that statement
6 then is not correct.

7 Q And then you go on to
8 state that:

9 "During August the caribou are distributed
10 approximately equidistant from the two routes."
11 Well, is that the case then, bearing in mind what we've
12 seen on these maps?

13 A Apparently not.

14 Q All right, so that at
15 least in respect of the August dispersal and coming
16 to your conclusions you and Mr. Jakimchuk were not
17 using exactly the same data. You hadn't taken into
18 account the August dispersal and its movements over
19 the interior route.

20 A Yes.

21 Q Now, you'd accept, I
22 take it, the other part of the statement made by Mr.
23 Jakimchuk that the spring and fall migrations cross
24 the interior route.

25 A Yes, I do, in some years.

26 Q Well, I could deal with
27 that for a moment.

28 A M-hm.

29 Q And refer you to page
30 16 of your evidence. At the bottom of that page Dr.

Calef, Lent, Bergerud
Cross-Exam by Carter

1 Calef, you state:

2 "For example, in the winter of 1972-73 when
3 the majority of caribou wintered in Alaska
4 these animals got to the calving grounds by
5 completely different routes, all of which
6 were north of the interior route."

7 A M-hm.

8 Q Do you still hold to
9 that statement?

10 A That was my impression,
11 yes.

12 Q I wonder then if I might
13 show you a slide of the wintering grounds, the winter-
14 area of the caribou herd in Alaska in that year? Have
15 you any data or personal observation to suggest that
16 that is inaccurate?

17 A No, I don't.

18 Q It appears then from that
19 slide that certainly a major part of the herd in moving
20 from its winter range would have to cross the interior
21 route.

22 A Yes. I'm not really
23 familiar with the density of animals, that is the number
24 of animals that would be distributed in different parts
25 of that. Assuming an equal distribution, then some of
26 the animals would have had to cross the interior route.

27 Q My information is that
28 it was approximately three-quarters of the -- yes, of
29 the 80,000 animals that wintered there were south
30 of the interior route. You have no information to

Calef, Lent, Bergerud
Cross-Exam by Carter

1 disagree with that?

2 A No.

3 THE COMMISSIONER: It's not
4 very important, I suppose, but we've been told and
5 no one seems to dispute it, that these animals, when
6 they're moving westward and they calve in the area that
7 has been discussed, and they continue to move westward
8 and the post-calving aggregation takes place more or
9 less on the Alaskan side of the border, and then they
10 move in the summer more or less back, rather more widely
11 dispersed, but there's a tendency to move eastward
12 back into Canada into higher ground and so forth.
13 Now, the post-calving aggregation is the herd that
14 constitutes the best known phenomenon of caribou exhibit
15 so far as the world is concerned, that's what people
16 think of and that occurs for a very limited portion
17 of the year. Now, could I just ask you, I had thought
18 from what all of you had said that that aggregation
19 -- that all the animals with the exception of strays,
20 came together, and one of the main purposes is relief
21 from insect harassment, and everyone seems to agree on
22 that. There may be other purposes. Now, two things:
23 Does the whole herd come together? Has that been
24 observed, Dr. Calef?

25 A Oh, certainly a very
26 high percentage of it does.

27 Q O.K. Now, is that
28 a feature of other caribou herds in Canada?

29 A Well, this is something
30 I've been looking into a little bit. Apparently it's

Calef, Lent, Bergerud
Cross-Exam by Carter

1 the western Arctic herds, the Porcupine and the Arctic
2 or western herd in Alaska that are most likely to have
3 all the animals in one or two very, very large groups.
4 I think this tendency to form much larger groups during
5 the summer is present in all caribou herds, but
6 apparently once you get east of the Mackenzie River
7 there's more of a tendency to have, say, ten or 20
8 groups of several thousand, let's say in a herd like
9 the Beverly or the Bathurst, which are 150,000. You
10 might have 10, 20, 30 groups of several thousand each
11 which makes it more difficult to census those animals
12 with aerial photography.

13 WITNESS BERGERUD: I'd like to
14 comment, the year I studied the Kaminuriak they got
15 together in a very large herd, and I think they were
16 almost all there together, and in Newfoundland even
17 though we have very small little populations, at least
18 two of my sub-populations, it looked like everybody
19 was there, the sex ratio was correct, the males were
20 there. These were the non-migratory sub-populations,
21 but for the four sub-populations that migrated,
22 migrations are pretty short in Newfoundland, all the
23 females and most of the yearlings were there, but a
24 lot of the males didn't make it to the post-aggre--
25 post-calving aggregation.

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Q You
 accept, Dr. Calef, that
during the spring and fall migrations, major portions
of the herd cross the Interior Route?

4 WITNESS CALEF: Yes, I would
5 say again in most years. I don't think that it is
6 inevitable. I think that large numbers of caribou
7 often winter north of the Interior Route, either on the
8 east side of the Richardson Mountains or in Alaska.

9 Q Well, I think that there is
10 perhaps some disagreement there, so I should deal with
11 that and if I could refer you to your evidence, on
12 page 15 you have dealt with this toward the bottom of
13 the page after the numbers 1 to 7 there, you say:

14 "We should also note that the Interior Route
15 avoids some winter ranges which the coastal
16 route goes through. These are the ranges on
17 the eastern side of the Richardson Mountains
18 which have been heavily used in recent years
19 and which are very important hunting areas
20 for the people of Aklavik, Fort McPherson
21 and Inuvik."

22 This is the point that you are making.

23 A Yes.

24 Q Now, have you the report
25 of Surrendi and DeBock?

26 A No, I said yesterday that
27 I haven't seen a copy of that.

28 Q Dr. Bergerud, do you --

29 WITNESS BERGERUD: He is bringing
30 it back, yes.

Calef, Lent, Bergerud
Cross-Exam by Carter

Q On page 11 of that report,
Dr. Calef, they state:

"Caribou wintering in the Richardson Mountains
did move south of the Rogue River. At times
these animals are distributed from the Rogue
River north to the Mount Goodenough, Willow
River area."

Would that not indicate that the caribou wintered
south of the Interior route?

WITNESS CALEF: Well, I know
that last year, for example, when I was living in Inuvik
that there were many thousands of caribou wintering
on the eastern side of the Richardson Mountains north
of the Interior Route.

Q In your understanding of
the Interior Route, where is it in relation to Fort
McPherson?

A I believe it is just about
directly west, perhaps a little bit southwest. YOU
are talking about the crossing of the Richardson Mountains?

Q Yes.

A Yes, that is my understanding
about that.

Q AND your evidence is that
the caribou were north of that line?

A Yes.

Q What about, were there any
caribou south of that line?

A I am not sure, I don't
believe that there were as many. In the first couple

Calef, Lent, Bergerud
Cross-Exam by Carter

of years that we studied the caribou, yes, there were many south of that line on the east side of the Richardsons, and also in the northern part of the Ogilvie Mountains and the headwaters of the Peel River.

Q So that the year that you spent in Inuvik was an exception to those other years?

A Yes, well, it was different yes.

Q Yes. Now, apart from that, however, the spring and fall migrations, generally, the major portions of the herd cross the Interior Route?

A When the majority of the herd winters south of the Interior Route, then they cross it on spring migration. When they winter north of it they don't cross it on spring migration.

Q Well, in what year does the major portion of the herd winter north of the Interior Route?

A Well, I am not sure that we have ever seen a major part of the herd yet winter north of the Interior Route.

Q So this is something that hasn't happened yet, but you are suggesting that it might?

A Well, I have spoken to residents in Old Crow and in Aklavik who have seen large numbers, and as I have said, my sort of impression from talking to people was that in the winter of 1974 there might have been something on the order of 20,000 caribou

Calef, Lent, Bergerud
Cross-Exam by Carter

north of the route.

THE COMMISSIONER: Well let me get this clear. You agree with the argument that the herd winters south of the Porcupine?

A No, not always.

THE COMMISSIONER: I see.

A And not -- and in years when some animals winter south of the Porcupine, others do not.

THE COMMISSIONER: Yes, but a large portion of that herd can as a rule be expected to winter south of the Porcupine, to cross the Porcupine?

A I think that that is probably correct, yes.

THE COMMISSIONER: Which means crossing the Interior Route?

A Yes.

MR. CARTER: Now, the Commissioner referred to the movement of the caribou along the coastal plain, the western movement ?

A Yes.

Q And when you were going through Mr. Jakimchuk's testimony offering your criticism of it, and referring to page 27 of your evidence, you said this. On page 13, referring to Mr. Jakimchuk's evidence we have the statement that the calving grounds is a terminus of the spring migration and of all movements.

Now, when you referred to this,

Calef, Lent, Bergerud
Cross-Exam by Carter

do you considered that you quoted Mr. Jakimchuk accurately?

A Gee, I hope so.

Q Could you take a look at
his evidence in that respect and tell me if you still
think so? Have you a copy of that, sir?

A Yes, I do.

MR. CARTER: And Mr. Commissioner,
have you a copy? This is the supplementary evidence
presented by Mr. Jakimchuk.

THE COMMISSIONER: Yes, well,
I didn't bring it down this morning. Sorry -- I know
it well.

MR. MARSHALL: Having memorized
it there is no use bringing it.

Calef, Lent, Bergerud
Cross-Exam by Carter

1 A I put a period at the
2 end there, which does not appear in his sense. There
3 should be three dots indicating that there was another
4 phrase in his sentence.

5 Q It changes the whole
6 meaning, doesn't it? Wouldn't you agree?

7 THE COMMISSIONER: What is
8 the passage here again?

9 A Perhaps I should read
10 what Mr. Jakimchuk wrote. He wrote:

11 "The calving ground is the terminus of the
12 spring migration -- and of all movements."
13 That's where I ended my statement of his quote,
14 comma,

15 "The arrival of the caribou in the area is
16 the most predictable and consistent event
17 in their movement cycle."

18 MR. CARTER: Would you not
19 agree that putting the period where you did changed
20 the whole sense of it?

21 A No, I don't think so
22 because the phrase that follows it says nothing to
23 qualify it, by saying of all movements, for example,
24 on spring migration, however there are other major
25 movements in the summer. It says nothing to qualify
26 the statement about movements.

27 Q Well, you found fault
28 with that statement.

29 A Well, I really don't think
30 the impression should be left that the movement of

Calef, Lent, Bergerud
Cross-Exam by Carter

1 caribou ends when they reach the calving grounds, or
2 that the movements just prior to, during, and for a
3 month and a half after calving are not to be considered
4 migratory movements. I think they are.

5 Q Well, would you not agree
6 that the reports of Renewable Resources well documents
7 the fact that there is western movement of the herd?

8 THE COMMISSIONER: Well, let's
9 just stop for a minute, Mr. Carter and Dr. Calef.
10 It's clear that Mr. Jakimchuk intended to say, and
11 did say, that the calving ground is the terminus of the
12 spring migration. He did not say nor did he intend to
13 say that it was the terminus of all movements, and to
14 that extent it seems he's been misrepresented by Dr.
15 Calef; but is that -- having established that, and
16 innocently misrepresented, I'm sure -- but having
17 said that, does that get us anywhere? We know they
18 continue to move west. Mr. Jakimchuk made that plain.
19 You carry on, but I have --

20 MR. CARTER: Well, Dr.
21 Calef mentioned yesterday a reference to being a devil's
22 advocate and I just wondered whether he was a little
23 over-zealous in --

24 THE COMMISSIONER: Well, these
25 people are -- they get a little over-zealous from time
26 to time, I notice that.

27 MR. CARTER: Q If I could
28 move on then, Dr. Calef, to the matter of compressor
29 stations.

30 A Yes.

Calef, Lent, Bergerud
Cross-Exam by Carter

1 Q Do you see these as a
2 significant disturbance factor?

3 A During construction or
4 in operation or entirely?

5 Q In operation.

6 A I suspect that the compres-
7 sor stations themselves are not. The added human
8 activity, depending on the extent of activity
9 activity/around the compressor station would add a
10 certain amount of disturbance to the actual physical
11 layout itself.

12 Q Now, again when you were
13 commenting on Mr. Jakimchuk's testimony, you considered
14 it -- I don't think it's your word but would it be fair
15 to say that you considered his reference to the Canning
16 River almost a red herring?

17 A As far as caribou are
18 concerned?

19 Q Well, perhaps you should
20 tell me --

21 THE COMMISSIONER: Not as far
22 as herring are concerned.

23 MR. CARTER: Q What importance
24 you place on the Canning River.

25 A I think -- well, maybe
26 I should just say that I think it seems to me that
27 three of the ten disadvantages of the interior route
28 which he listed had to do with activities in the
29 Canning River, and I think to single out this area
30 out of the 100,000 square mile range of this herd
was over-emphasizing it a bit, because I don't think

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Cross-Exam by Carter

1 that it's ever used by more than a few thousand
2 animals from this herd. I don't know the exact figure
3 but I don't think you would see ever something on the
4 order -- I wouldn't think you'd see anything over 10%
5 of the herd ever using that area, whereas some of the
6 other areas you see 90% of the herd using it.

7 Q But you're speaking of
8 caribou now, not of mammals as a whole.

9 A Oh, definitely yes,
10 my testimony is on caribou.

11 Q You haven't been --

12 A I've never been to the
13 Canning River to observe any of the other mammals.

14 Q Now, in your assessment
15 of the coastal route versus the interior route, are you
16 in the same position as Dr. Lent, in that you find it
17 pretty difficult to separate the wilderness concept?

18 A Well, I certainly do.
19 Actually two of my points in favor of the interior
20 route were that it could avoid the wilderness in a
21 formal sense, that is the Arctic Wildlife Range and
22 also the wilderness in the psychological sense that
23 there was no, or a very low level of human activity
24 there.

25 Q Now, dealing with just
26 the pipeline itself, and apart from the consideration
27 of what might follow it, but the buried gas pipeline
28 in your report to the E.P.B. you concluded that if
29 your recommendations were followed, that there would
30 not be a significant impact on the Porcupine caribou

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Cross-Exam by Carter
Cross-Exam by Ryder

1 herd, is that correct?

2 A Yes, I think that if
3 all the recommendations that have been put forward by
4 various groups -- the E.P.B., Mr. Jakimchuk, and so on --
5 that the effect on the Porcupine herd would probably
6 not be significant from that project alone.

7 MR. CARTER: Yes. Sir, that's
8 all the questions I have of this panel.

9 THE COMMISSIONER: Thank you,
10 Mr. Carter.

11
12 CROSS-EXAMINATION BY MR. RYDER:

13 Q Can I ask the other
14 members of the panel besides Mr. Calef to comment on
15 the slides that we've seen of Mr. Jakimchuk's showing
16 the inter-action between the interior route and the
17 summer movements, the fall migration, the winter range,
18 and the spring migration on the one hand, and ask you
19 to compare that inter-action between the caribou life
20 annual cycle with the interior route with the magnitude
21 of the inter-action of the coastal route in the brief
22 period of time when the caribou are using the coastal
23 plain? Do you appreciate what I'm trying to get at,
24 Dr. Bergerud?

25 WITNESS BERGERUD: I thought
26 you were looking at Dr. Calef.

27 Q No. Dr. Calef has had his
28 moment in the sun and I would like to ask you to dis-
29 cuss the same questions that Dr. Calef was speaking
30 about.

Calef, Lent, Bergerud
Cross-Exam by Ryder

1 A Follow these animals around
2 all their routes?

3 Q We've seen that there is
4 an inter-action between the interior route and the
5 summer movements of the caribou, and the August dis-
6 persal, secondly the fall migration, and thirdly
7 the winter range, and fourthly the spring migration
8 across, for a major portion of the herd, across the
9 interior route. I would ask you to compare the impact
10 of that inter-action with the impact as you foresee
11 flowing from the coastal route.

12 A I feel that I would have
13 to know what impacts you were talking about. Are we
14 talking only of the buried pipeline done exactly as
15 the applicant says he will do it? Is there some
16 -- shall I talk about what an elevated pipeline along
17 this same route will do, and a road? Because these
18 are the things that I think will happen and I'm very
19 concerned about.

20 Q For the moment can you
21 discuss the construction activities that will take
22 place during the wintertime in the interior and the
23 construction activities that will take place in the
24 coastal plain in the wintertime and the summer activ-
25 ties such as the construction of the compressor stations
26 and the airfields? I just want to compare the construc-
27 tion and operation of buried gas pipeline for the
28 moment, without any other additional developments that
29 may follow.
30

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Cross-Exam by Ryder

A Well, my conclusion

in my statement was that I thought that a buried pipeline could be built along the coastal route and the Porcupine herd could prosper if it was constructed as they say they will do it, and because I think that the coastal route is much more sensitive than the Interior Route, I would certainly think that this pipeline could be built along the Interior Route, also. So, if we could start with the caribou on the winter range , I am not greatly disturbed about construction on the winter range. There are a very large area that these caribou winter in. There are plans afoot to avoid conflict with people and machines and caribou. There is in my work what I call the critical winter range, the optimum winter range. This is the very best winter range there is. This is the place that caribou go when things really get bad, and where there is no better place to go and I think that these areas exist in this herd and have not been documented. The distribution maps that I see don't relate to snow conditions. They are aerial work with, appears to me to be very little ground coverage, so that there are some very key winter areas, I think. There are other caribou herds where they can find the best flora. They need three layers of flora. They need trees, and they need shrubs and they need the cryptogram, they need the ground layer, and when snows get deep -- when the snows are shallow you feed on the lichens, and they get deeper and you feed on the shrubs, and then they get a little deeper and you smell the shrubs and then .

find the lichens, and then they get a little bit deeper and then you feed on trees, and then they get a little deeper and they can't find anything and just stand there and wait for spring to come, because things can get pretty bad. So, I don't know where these key areas are, but I view the winter range as an area where these animals can adapt to disturbance, it is part of their phylogenetic history to be interacting with wolves and having considerable flight patterns and escape behaviour in relationship to disturbance.

I mentioned in my text that I thought that the building of winter roads, snow compaction, would change the wolf - caribou interaction, and that is , in my view, the most serious thing in the wintertime I get so upset when I continue to hear all this talk about man versus caribou. We have got a whole ecosystem here and nobody ever talks about what man does to the wolves and then what will the wolves do to caribou, because man can certainly change the wolf - caribou interaction and these wolves are going to eat caribou, and so I think that a lot more work has to be done on what wolves are going to do. I mean, construction work is going to affect wolf abundance. I remember dropping in one time to the mid-Canada line. I don't go as far north as you are, guys -- asked a Newfie there if there were any wolves around, a standard question, "Yes, my son", everybody is "my son" in Newfie . Hundreds, Well, you use Able's law when you are talking to Newfoundlanders and that's if you want to be able to

come up with the right estimation you divide everything by ten, so I thought that maybe there were ten animals. I went down to the dump and there indeed were seven dead wolves. So that wolves can become the park bears of the north. They will co-exist with man and come into dumps. So I am very concerned about what roads will do to wolf-caribou interactions and I am concerned about how man can maybe change the food chain, dumps and so forth, for wolves.

However, I think that with further knowledge on what are the key areas, these critical winter ranges, and these critical winter ranges are only important in those very tough winters and they might construct this line during some winter when it wasn't really tough. Actually, you can tell somewhat about how tough a winter is by how large an area the caribou are in. The milder the conditions the less difficulty they have in finding food, the bigger the area they will be in. The smaller the winter range, they are getting restless, all right.

I think that caribou will cross the line on migration. I can't conceive of them not crossing a buried pipeline, and I have got to assume that the applicant is going to get out of the way and let them go across during construction. I just can't come to grips with slippage like Dr. Lent does. I don't understand how things fall down on the job compared to -- I know they do, but I have to assume that they say people are going to do what they say.

Q And Dr. Lent, you've seen

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Cross-Exam by Ryder

from the slides the interaction between the Interior Route and the movements of the caribou. Does that in any way affect your views that you gave us earlier, that the coastal plain is to be avoided and the interior route is to be preferred?

WITNESS LENT: No, because I think that we are just playing a numbers game. Again, you have to come back to what is biologically most critical and I think that we have already talked at great length. Many of us have presented reasons why the calving and post calving areas are most critical, in most short supply, as it were.

WITNESS BERGUERD: I certainly would like to be able to say again that the calving and the post-calving time are most critical and that these slides certainly showed us that the post-calving herd was on the other side of the coastal line and this is key habitat to get away from insects, and I believe it must be, and if Frank Miller's hypothesis is correct, that this is where animals get together to come up with old acquaintances and get the genetics of the population sorted out, then it is even more important, and these large herds can really be stampeded and we can lose all kinds of animals in one mad rush. It only takes one helicopter coming over thousands of caribou bothered by insects, and you have lost hundreds of calves. This has been documented in the literatures, so there is potential there, that caribou are much more susceptible. We can set up things on the winter range, but you have lost a lot of the young

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Cross-Exam by Ryder

animals already. We are down to a much smaller cohort, and the young animals are already much more a part of the adult population than they are young calves, so the chance of mortality by slippage, slippage on the calving grounds and the post-calving aggregation are very serious and I certainly think that the herd can survive if slippage doesn't occur and they really do what they say they will do.

Q Slippage, I take it, will be less of a factor in the Interior Route than it would on the Coastal plain?

A That is my view, yes.

WITNESS LENT: That is mine also.

Q I take it it is yours, Dr. Calef?

WITNESS CALEF: I am not sure. It's pretty cold and tough to work in both of those areas.

Q Well, by that, I am talking about the effect on the caribou, not the effect on man.

A Oh, I thought that you were talking about the slippage date.

Q All right, can I go on now, Dr. Lent, to another problem, and that is the interaction between, or the potential interaction between the Bluenose ^{herd} on the east of the Mackenzie and the reindeer herd, that small herd of 5,000 to 6,000 animals that winter between the Mackenzie and the Miner river. Now,

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Cross-Exam by Ryder

1 let me set the factual background to my question. We
2 have had some evidence here that the Bluenose herd
3 numbers about 100,000 and its winter range is
4 increasing, expanding westward, and that the pipeline
5 will cross through the centre of the small reindeer
6 herd in the delta and that we will have access roads
7 and a scrubbing plant and some production facilities in
8 the middle of the reindeer herd, and I wonder, because
9 I understand that the reindeer herd originated in
10 Alaska to begin with, that your experience with
11 reindeer could give us some indication as to the con-
12 sequences on the reindeer herd and on the Bluenose
13 herd of these expanded activities within in the
14 midst of the winter range of the reindeer herd?

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Cross-Exam by Ryder

1 WITNESS LENT: Maybe it
2 would be helpful first to just talk about the reindeer
3 and caribou and make believe for a moment that there
4 won't be any development in the delta, that is relating
5 to oil and gas. Yes, the reindeer in the Mackenzie
6 Delta were brought from Alaska and they in turn, their
7 ancestors came from Siberia. The history of the reindeer
8 industry in Alaska has not been a very good one, and
9 over the past century almost inevitably when reindeer
10 herds have come into contact with wild caribou, the
11 reindeer herds have suffered and in most cases been
12 lost entirely. I mentioned yesterday one of the reasons,
13 probably the main reason for this is simply the loss of
14 reindeer into the wild caribou population. That is
15 the herders have been unable to control the reindeer
16 sufficiently to prevent them mixing and moving off with
17 wild caribou. This, of course, is a problem which is
18 roughly proportional to the size of the caribou herd
19 you're talking about. In other words obviously
20 if a movement of 30,000 caribou is coming through,
21 it's more likely to absorb a relatively small, and
22 most of our reindeer herds are quite small -- let
23 me start over again, it's likely to absorb a relatively
24 small herd or large portions of that herd. This has
25 happened over and over again.

26 At one time there were several
27 reindeer herds in the north-western part of Alaska in
28 areas now occupied by the western Arctic caribou herd,
29 as it has expanded over the last decade. This is not
30 the problem, although the level, the quality of herding

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Cross-Exam by Ryder

1 in Alaska is not up to the standards existing in
2 Scandanavia and the Soviet Union, this is not a problem
3 limited to Alaska. It's been a major problem in the
4 Soviet Union, too. Now that's one problem which the
5 Mackenzie Delta reindeer herd faces then, I gather,
6 in connection with the bluenose caribou herd's expansion.

7 A related problem is that
8 caribou herds do very frequently attract wolves, and
9 this presents a problem to the reindeer industry,
10 it presents a problem to the game manageme nt agencies
11 who have to make decisions about wolf control practices
12 and are then facing conflicting pressures from those
13 who desire to preserve wolf populations at a high level,
14 and those who are more concerned with the reindeer
15 industry.

16 Q Can the ambit of the
17 winter range of the reindeer herd be controlled and
18 kept away from the Bluenose herd if there is development
19 in the middle of it?

20 A Yes, well I was going
21 to get to the development part of it. One other point
22 though before I talk about the development is that
23 a third problem which we've encountered in Alaska is
24 that hunters very frequently have trouble telling the
25 difference between reindeer and caribou, either acci-
26 dentally or deliberately, and in the reindeer herd
27 for example near Kotzebue, Alaska, we've lost many
28 reindeer to hunters who claim they were shooting caribou.
29 So those are --

30 THE COMMISSIONER: Isn't that

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Cross-Exam by Ryder

1 a legitimate defence? That is isn't it -- it's not
2 easy to --

3 A That's quite correct, yes.
4 It's not easy for a layman to tell them apart.

5 Another problem which relates
6 to caribou-reindeer inter-actions of course, is the
7 transfer of disease between those domestic populations
8 on the one hand and wild populations, and we suspect
9 that the reason that brucellosis is so high in our
10 western Arctic caribou herd is because of the introduc-
11 tion from Siberian reindeer, and it is endemic in
12 Siberian reindeer.

13 O.K.,^{so} so that's the situation
14 even before you get to development. Now the problems
15 associated with development in connection with^a reindeer
16 herd are manifold. First of all we have, as is well
17 known from Scandanavia, as soon as you have roads you
18 have traffic. There are many opportunities for animals
19 to be hit, killed directly through collisions with
20 vehicles. We have problems of the herders, although
21 the road system may aid herders in permitting them
22 greater mobility, if you have a system of above-ground
23 feeder pipes, both the reindeer will be hindered and
24 the herders will be hindered. You have problems in
25 getting the most efficient use of range, that is
26 herders will be -- unless proper crossing facilities
27 are constructed, herders will have difficulty in getting
28 the reindeer to the right portion of the range at the
29 right time and to keep a range rotation program going
30 so that winter range in particular areas is not over-

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Cross-Exam by Ryder

1 grazed. A problem which, another matter which I can't
2 recall being mentioned which were seen down in the
3 Prudhoe Bay oil field is tremendous quantities of
4 dust falling on the tundra from the road surfaces.
5 This dust, depending of course on wind patterns, is
6 evident miles from the roads in question. This dust
7 affects the -- we know the dust affects the rate of
8 melt of the snow cover and therefore has an effect on
9 the vegetation within this road network. We don't
10 know what long-term effects this dust may have on
11 vegetation in particular the lichens. It does have
12 the immediate effect -- and I believe I mentioned this
13 before -- that it attracts herbivores to the areas
14 along roads, and again it increases the chances for
15 animals coming up on the road, crossing the roads,
16 and being struck by vehicles.

17 As a possible solution for
18 that problem, they have attempted application of crude
19 oil to road surfaces in the Prudhoe Bay area. This .
20 also, there has been no research done so far as I know,
21 has some ecological implications. The oil, the crude
22 oil gets emulsified, is perhaps the correct term, it
23 gets sprayed off the road onto adjacent vegetation.
24 We have seen carnivores, foxes and wolves whose hair
25 was noticeably matted from this oil, emulsified oil.

26 Another serious potential
27 problem of industrial development in the delta which I
28 believe the INquiry is going to address later, but I
29 just want to mention it as a caribou biologist, is the
30

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Cross-Exam by Ryder

1 problem of air pollutants, sulphur dioxide in particular
2 which I would presume would be present in the air from
3 various sources in the developments contemplated in the
4 delta, and can be spread for many miles, depending
5 again on the winds. So it could also affect winter
6 range of the Bluenose caribou herd. Scandanavians
7 again have done most of the research on this subject
8 and have a pretty good -- I would say a very good --
9 evidence that in fact industrial pollution from the
10 United Kingdom is materially significantly affecting
11 reindeer winter ranges in Scandanavia, decreasing the
12 productivity of these lichen ranges.

13 THE COMMISSIONER: You mean
14 the pollutants carried on the wind from the United Kingdom
15 to Scandanavia.

16 A Yes, that's correct.
17 I understand with chemical techniques these can
18 be specifically identified with certain industrial
19 processes in the U.K. or in Western Europe, and -- but
20 the point, I am not at all a botonist or a plant
21 physiologist, but the point which should be brought out
22 in further detail is that lichens, because of their
23 nature, are particularly sensitive to these pollutants,
24 much more so than rooted vegetation such as sedges or
25 browse or whatever.

26 That's all that comes to mind
27 at the moment.

28 MR. RYDER: What you have been dealing
29 with now is that a series of activities causing impacts
30 that are not directly related to the pipeline construction

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Cross-Exam by Ryder

1 itself but other facilities, and while you're on that
2 subject although I didn't mean to get into it, but while
3 you're on that subject, when the people in Alaska were
4 predicting the impacts of their oil pipeline construction
5 did they also address these related activities,
6 associated activities, placing the emphasis on those
7 activities?

1 A Well, when you say
2 addressed, they were addressed, I suppose, they were
3 considered, mentioned in various environmental impact
4 statements, but as I stated before, the very fine
5 monitoring system which was developed to deal with the
6 pipeline did not include the oil field. Generally
7 speaking, very little attention was given to the
8 whole network, the whole maze of feeder pipes and
9 associated roads and drill pads and collecting stations
10 and this whole matrix of manmade constructs which occur
11 in the general area of Prudhoe Bay. I think this aspect
12 of it was played down and partly just because of the
13 public attention on the "big pipe".

14 Q To go back to the reindeer
15 herd, we have a fairly contracted winter range between
16 the Miner and the Mackenzie Rivers, and what I want
17 you to tell us is what in your view will happen to that
18 herd as it is wintering there if introduced into the
19 area is all the complex of related activities, including,
20 for example, the scrubbing plant and roads, and perhaps
21 an airport or two?

22 A Well, I don't know that
23 area in detail, but I do know quite a bit about the
24 history of the reindeer industry in North America and
25 it is at best a marginal industry. It has some value
26 in local culture and could potentially have great
27 value in local economies, but for various reasons it has
28 never really caught on -- in fact, the peak in Alaska
29 was back in the early part of the century and since then
30 there has been somewhat of a decline. In view of all the

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Cross-Exam by Ryder

problems already associated with the industry, I would say that the picture for the Mackenzie Delta reindeer herd is one of disaster because of the combination of factors that you mentioned already, and I mentioned. Another one certainly to be considered in your economic phase is that being a reindeer herder, certainly in Alaska is not a very good paying position and with the potential for employment which I would assume would exist in the Delta you are not likely to have any herders left, anyhow.

Q Well, won't this activity tend to disperse the winter range? Disperse the caribou over the winter range and bring them into contact with the Bluenose?

THE COMMISSIONER: Excuse me, disperse the reindeer over the winter range?

Q Yes, yes. Expand their winter range and bring it into contact with the Bluenose herd?

A Well, it certainly will fragment, and then again, not being particularly familiar with the area, I am not sure that I can say that definitely. It is certainly a possibility, and then, again, it would also depend on how the Bluenose caribou herd responds to the development. So you are going to have fragmentation, you are going to have a decrease in your ability to use the range efficiently and on a wise system.

Q Now, because of your activities in Alaska and with the university there and

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Cross-Exam by Ryder

the wildlife agencies in Alaska, do I understand that you have some familiarity with the wildlife management activities of the Alaska Fish and Game Department?

A Yes, quite a bit.

Q And, we being concerned in this Inquiry with the additional load which we see falling upon the game management agencies in Canada, and I wonder from your Alaska experience if you can tell us a little bit about the additional, if any, game management responsibilities which fell upon the Alaska Fish and Game Department?

A Well, to start out by talking about the direct monitoring of the pipeline construction. In that regard, the Alaska Department of Fish and Game, the state agency, has hired approximately fifteen additional personnel. These are directly involved in monitoring or in administrative matters connected with monitoring.

The U.S. Fish and Wildlife Service, I believe has probably a little less, approximately ten additional personnel. All of these positions are, as I understand it, reimbursable, that is, both the salaries and the costs involved with the monitoring, are reimbursed by Alyeska Pipeline Services Company.

In addition, there are wildlife biologists and fisheries biologists on the staff of the U.S. Bureau of Land Management, which are working directly in connection with the Trans-Alaska Pipeline. So, and then there may be a couple with other agencies, I think perhaps one with National Marine Fisheries. So,

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in total we are talking about, I would think, at least thirty biologists and technicians directly involved in monitoring, and most of those, then, were reimbursable positions, not adding significantly to the budgets of those agencies, or to the cost to the taxpayer, anyhow.

However, there has been relatively little expansion possible to deal with the indirect effects of the pipeline construction. For example, the oil field which I would hardly call an indirect effect, but it is the cause, I suppose -- at any rate, so far as I know, there has been no significant expansion of staff, certainly in the state agency, to deal with this aspect. There is one game biologist in Arctic Alaska, permanently stationed there.

Q These additional people are over and above the JAFWAT personnel?

A No, that is what I am talking about. These fifteen positions, that is the JAFWAT, state JAFWAT staff. But the point that I was trying to get to, rather slowly, is that there are a great deal of indirect effects of construction which relate to increase of air travel in the north, increase in the number of airplanes owned and used by individuals, an increase in individuals, a multiplicity of indirect effects for which the state certainly has not been able to gear up adequately to face because of budgetary restrictions and insofar as I know, no attempt or nor serious attempt was made to obtain such positions with reimbursement from Alyeska.

Q Now, the JAFWAT personnel

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Cross-Exam by Ryder

don't do any game management function. They are just there to enforce regulations as best they can.

A That is right, they are there to advise on enforcement of regulations.

Q All right, but they are involved in the enforcement of the regulations as opposed to managing the game and regulating the non-construction personnel people?

A That is correct, and even in that capacity which you describe, they are rather limited in what they can do. In theory, I believe, they have enforcement powers that is the same as a fish and wildlife protection officer, a game warden, if you like. In natural fact, they've hardly ever used those powers. One reason, I believe is that many of the JAFWAT personnel feel that they are inadequately trained in the enforcement process, that is, how to take evidence, how to grab onto a guilty party and how to transmit evidence to the proper authorities and that type of thing. I believe that they have had some training in that, but not a great deal.

Q I want to leave JAFWAT alone for a moment and just deal with the game management responsibilities of the Alaska Fish and Game Department and that is the regulation of, in effect, non-pipeline personnel, and was there any additional preparation made to meet those responsibilities which the Alaska Fish and Game Department foresaw as a result of the pipeline?

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1 A Well, to a very
2 limited extent within great budgetary restrictions
3 facing the state, they made some attempts to produce
4 a very good set of wildlife habitat maps and to develop
5 some game policies for certain areas which they hoped
6 would help them cope with these problems as they arose.
7 But as far as buildup in personnel, very, very little.
8 There is -- we were talking yesterday about additional
9 positions which would be desirable; to contrast that
10 shocking list with what we have now in Alaska, the
11 State of Alaska has one permanent full-time game
12 biologist for all caribou studies north of the Yukon
13 River. In fact, I believe including the Steese
14 40-mile herd, plus some temporary assistants. So you
15 can see he receives help of course from what are called
16 area biologists, that is biologists dealing with local
17 areas in the state, for example, there is an area
18 biologist in Barrow, another one in Nome, but essen-
19 tially one research type biologist for that entire
20 part of the state.

21 Q In terms of game
22 management, very little additional preparation was
23 -- additional steps were taken.

24 A That's right, and of
25 course besides looking just at numbers of personnel
26 I think that there are a number of other steps that
27 should be taken or could have been taken in Alaska,
28 and that is of course a very careful review of Statutes,
29 laws on the books which might need revision, which
30 might be more critical in terms of enforcing of these

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1 laws in connection with the development. For example,
2 the laws on harassment of game, I certainly couldn't
3 quote the law as it reads in Alaska, but I gather
4 the impression that most of the enforcement people and
5 the biologists is that it's something that's extremely
6 difficult to enforce. The same applies to feeding of
7 game, which is a slightly different thing.

8 So the whole -- one would want
9 to look very closely at what laws one has on the books.
10 I think the one we have in Alaska on open -- as Dr.
11 Calef described yesterday -- of year-around no limit
12 no bag limit hunting of caribou should have been looked
13 at very closely before development started. Again,
14 game management enforcement depends upon the ability of
15 your judicial system to handle cases, your attorneys,
16 attorney-generals or whatever, if you call them that
17 here, and I have the impression and I must emphasize
18 this is only hearsay and you should try to get good
19 information later on, but I have the impression that
20 many times cases involving game are -- or pollution
21 even -- are not being dealt with simply because various
22 staffs, not necessarily those in the Game Department,
23 are overworked because of the rapid development in
24 Northern Alaska.

25 Q You mean the judiciary and
26 the enforcement processes?

27 A Yes, the enforcement, the
28 prosecutor, that's the word I was trying to think of.
29 The Prosecutor's Office, that type of thing.

30 Q Well now, this lack of

Calef, Lent, Bergerud
Cross-Exam by Ryder

1 preparation that you've described in the game management
2 area in Alaska, how serious has that been, how serious
3 have the consequences been? We should really kind of
4 make an effort to beef up our game management facilities.

5 A Well, I certainly hope
6 you do. The seriousness of the consequences, of course,
7 like many biological consequences, may not be evident
8 for quite some time to come, and for example our oil
9 field feeder lines and that sort of thing are just
10 still -- construction on those is just getting under
11 way now. We have probably reach^{ed} a peak in terms of
12 construction personnel in the state, or will next
13 summer, but the biological consequences of all these
14 things are not sometimes immediately evident, and maybe
15 we don't have enough biologists to tell what the
16 consequences are, even if they were there, though we
17 can see certain things occurring, particularly a
18 great increase in hunting throughout Northern Alaska.
19 Some of this is just due to increased familiarity with
20 the area, I believe. People see these names in the
21 newspapers and they hear about them, and they start
22 thinking about them and they end up going there hunting.
23 That may sound awfully simple-minded, but I believe
24 that's what happens. We've seen a great increase in
25 hunting of moose on the Arctic tundra where we have
26 some moose populations along the Arctic rivers such
27 as the Colville River. We've seen a great increase in
28 hunting of Dall sheep in the north-eastern part of the
29 Brooks Range. We don't have personnel to regulate,
30 to enforce laws in this regard and to monitor these

Calef, Lent, Bergerud
Cross-Exam by Ryder

1 populations away from the pipeline corridor.

2 Q Now, Dr. Calef, you've
3 heard as much, and Dr. Lent, you've heard as much evi-
4 dence with respect to caribou at this Inquiry as
5 anybody, I would suggest. As a result of that have
6 you come to any conclusions, Dr. Calef, as to what
7 the Inquiry should do? Have you got any simple
8 list of conclusions as to what we should do in order
9 to protect the caribou?

10 WITNESS CALEF: Yes, I
11 think I made a list of stipulations that I thought
12 were required in my final report with the E.P.B. I
13 also contributed to the outlining of regulations
14 pertaining to caribou in that, in their code as well.
15 So I think that would cover most of it. I would
16 certainly concur with Dr. Lent that the consideration
17 of the management problems is a very important issue,
18 and I think that -- and this is something that's very
19 important to me -- and I think that this is something
20 that the applicant really should not lose the advantage
21 of and that is the tremendous amount of work, basic
22 biological work on the caribou that he's put in already.
23 It would really be a shame if he didn't follow up this
24 work, following construction and operation, if there
25 is a pipeline, and I would very much like to see a
26 formal plan for monitoring -- and I'm talking about
27 again in the demographic and behavioural sense of
28 caribou -- tabled as an exhibit.

29 Q And I take it you're
30 particularly interested that that will proceed before

Calef, Lent, Bergerud
Cross-Exam by Ryder

1 any agency considers additional development. In other
2 words we can assess the impact of this development
3 on the herd before we start considering a further
4 undertaking.

5 A Yes, that's right, because
6 I think this same, if you had a study of the Porcupine
7 herd, now you'd also be including the effects of the
8 Dempster Highway which will certainly receive a great
9 deal more use if a pipeline is constructed, and I think
10 you'll also begin to see some of the effects of an
11 increased population and increased access and increased
12 familiarity, as Dr. Lent spoke about, and how it's
13 going to strain your management capabilities, and your
14 enforcement capabilities, and then you would be in
15 a position to judge what else could be handled.

16 Q Do you have any enforce-
17 ment responsibilities with the Northwest Territories?

18 A No. No enforcement.
19 Obviously I have management responsibilities.

20 Q Are you or any member of
21 the panel familiar with the problems of enforcing
22 harassment by the use of snowmobiles when hunting,
23 or aircraft harassment? How is that done?

24 A I would say it isn't.

25 Q How can it be done?

26 A It's very difficult.

27 WITNESS LENT: I can only add
28 that when you're speaking about the vast areas that
29 we're dealing with, it is of course extremely difficult
30 and the enforcement people, first of all you have to

Calef, Lent, Bergerud
Cross-Exam by Ryder

1 have a sufficient number of them, which is I would
2 think a relatively high number. Secondly, they need
3 extremely good mobility in order to enforce any regula-
4 tions of that nature. They need to be able to be
5 more mobile than the people that are breaking the
6 law, or potentially breaking the law, and that's
7 extremely difficult to do.

8 Q I take it, Dr. Calef,
9 you'd add to the conclusions you gave us your view
10 that the coastal area ought to be avoided.
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Calef, Lent, Bergerud
Cross-Exam by Ryder

WITNESS CALEF: Yes, I would, and I have just been thinking about one of the difficulties that Mr. Carter pointed out with my testimony this morning, the fact that the August dispersal of a fairly large portion of the Porcupine herd does encounter the Interior Route. I said yesterday that my suggestion that serious consideration be given to a route south of the Porcupine River was formulated more on other considerations than caribou, but here is a very strong suggestion, that for avoiding the August dispersal or a good part of the August dispersal, we would have to go south of the Porcupine River on an interior route.

Q Dr. Lent, do you have anything to add to these, I think there are four major conclusions which Dr. Calef came to. One was the coastal area to be avoided. The second is that the regulations which we can see in the E.P.B. report ought to be observed, and I think that Dr. Calef was referring to the prohibition against flights in the critical times and manners of that kind -- right, Dr. Calef?

A Yes.

Q And then thirdly that further research should be done to study the populations and the effect on populations of this project before we start our considerations of any further projects, and then fourthly that game management schemes be in place before we commence this project. Have I summarized your conclusions, Dr. Calef?

A Yes, I think that those would

Calef, Lent, Bergerud
Cross-Exam by Rvder

be the major ones. Thank you very much.

Q Do you have anything to
add to that, Dr. Lent?

WITNESS LENT: Just the question,
what are you going to do when recommendations are
impossible to meet?

Q Well, now, that is not a
conclusion, that is a query.

A Okay, the conclusion is you
have to decide what you are going to do ahead of
time if a recommendation cannot be met, for example,
if caribou remained, just to take a hypothetical
case -- if caribou remained all winter on the coastal
route, assuming that the coastal route was selected.

Q So I take it that what you
are suggesting is that the contractors, when they
submit their bids bear in mind these possible contin-
gencies?

A Yes, and that government
bear it in mind and consider the economic and political
consequences of those possible contingencies.

Q Dr. Bergerud, do you have
anything to add to those observations?

WITNESS BERGERUD: No, they
seem to be all encompassing. I would just agree with
Dr. Calef that the research should go on and I think
that it should become considerably more sophisticated.
The caribou research has really dealt with movement and
distribution, and I don't know how much foot slogging
has been going on for caribou, and I think that they have

1 got to get on with the demography work, and if this
2 pipeline doesn't want to be blamed for a subsequent
3 decline, which could happen, without any connection between
4 the pipeline, they should continue the research until
5 we've got the predictive data to know how populations
6 are responding to this increased access, I am awful
7 upset about access when people get in there, you know,
8 people are the bad guys. When people get in the north,
9 things start to get out of control and I am discouraged
10 that they have worked more on grizzly bears, it appears
11 to me than they have on wolves, the chief predator of
12 the system, and they have got to do a lot more with the
13 carnivores.

14 THE COMMISSIONER: Mr. Ryder,
15 let's stop for coffee a moment.

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17 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)
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Calef, Lent, Bergerud
Cross-Exam by Ryder

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. RYDER: I've been asked to, Dr. Bergerud, have you explain what you mean by your wind chill mortality paragraph at the bottom of page 9, and it seems that it's greater in May than it is in June. Sorry, it's greater in June than it is in May. Will you explain that?

WITNESS BERGERUD: I don't see May there at all. Oh, all right. Well, this is a question of evolution again. It's complex. Caribou herds have evolved the best time to have their calves. Female that calve too early in the season died for various reasons because genetics has not been passed on, or their calves died, and caribou that calve too late in the season had increased mortality. Maybe their calves were born during the fly season and the old lady wouldn't stand for the calf to nurse. So that the date of birth, in my view, is a reflection of how harsh the environment is. Caribou should calf as early as they can, other things being equal, so that they will be well-developed by the fall. So the calving date of June 12th for the herds near Hudson Bay is a late calving date, and suggests a harsh environment at calving time. Calving date of May 28th suggests a more moderate natal environment, and so the Kaminuriak herd is more towards the June 12th date than the May 28th date, which suggests to me that meteorological effects could have been harsh on the calving grounds in the past and wind chill is a big possibility. Is that no good, eh?

Calef, Lent, Bergerud
Cross-Exam by Ryder

MR. RYDER:

It's just me, I don't know about the others. Well, thank you. Those are all the questions I have and I'd like to thank the panel for staying so long.

THE COMMISSIONER: Have you completed?

MR. RYDER: I'm completed, yes.

THE COMMISSIONER: Do you have any re-examination?

MR. ANTHONY: I have no re-examination, Mr. Commissioner, but before the panel steps down I think Dr. Lent wanted to address a few words to the Inquiry.

THE COMMISSIONER: By all means.

WITNESS LENT: When I first gave my evidence in chief last year I said that I was speaking entirely as an individual, as a biologist. However, I said at that time I'm also vice-president of the Alaska Conservation Society, and I would just like to make a few remarks at this time on behalf of that organization.

The Alaska Conservation Society, of which I'm vice-president, has a membership of approximately 1,000, and it was founded in 1960 to promote the wise use of natural resources in Alaska. The Conservation Society is also an intervener before the U.S. Federal Power Commission on the matter of the Arctic Gas line. I don't want at this time to make a formal brief on behalf of the Society. They are

Calef, Lent, Bergerud
Cross-Exam by Ryder

1 following with great interest this Inquiry, and based in
2 part on information available in the press, and what
3 I have related to them, they were very interested and
4 feel that it is a very worthwhile endeavor and something
5 which we would like to see more of on our side of the
6 border. I do have with me today a publication of the
7 Alaska Conservation Society. It is the, "Alaska
8 Conservation Review" which we publish four times a
9 year, and it has in a particular issue just coming out
10 -- which just came out about a month ago, dealing
11 particularly with oil and gas development in Alaska,
12 and within that issue there is an article entitled:

13 "Gas transportation from the Arctic,"
14 which essentially represents the position of the
15 Alaska Conservation Society on the subject, and I'd
16 like if, with your permission, to have this entered
17 as an exhibit.

18 It's quite possible that at
19 some time in the future, either at your southern
20 hearings or at your possible Fairbanks corridor
21 hearings, which will be a little closer to home for
22 us, that a representative of this Society would wish
23 to appear if possible and present a formal brief at
24 that time. Thank you.

25 THE COMMISSIONER: Thank you,
26 Dr. Lent. If we do hold a further hearing at White-
27 horse, and I say "if" because it's very much up in
28 the air, we'll let you know. It may be that the Alaska
29 Conservation Society would wish to make a submission
30 there. We'll also let you know where our southern

Calef, Lent, Bergerud
Cross-Exam by Ryder

1 hearings are to be held when and where our southern
2 hearings are to be held -- that's Southern Canada.

3 A I realize that.

4 THE COMMISSIONER: And it may
5 be that the Alaska Conservation Society would like to
6 make a submission at that time.

7 Do you have any re-examination?

8 MR. ANTHONY: I have no re-
9 examination, Mr. Commissioner.

10 THE COMMISSIONER: Well, I
11 want to thank the panel. We heard from Dr. Calef and
12 Dr. Lent before Christmas and certainly it was a great
13 privilege for us to be able to hear what both of you
14 gentlemen had to say then, and again this week, and I
15 certainly appreciated Dr. Lent coming from Alaska and
16 Dr. Calef coming from Wood Buffalo Park. Dr. Bergerud,
17 I want to thank you for coming. You were a well-known
18 figure at this Inquiry ^{even} before you appeared in the
19 flesh. Your work was cited in support of every
20 conceivable proposition put forward.

21 WITNESS BERGERUD: Wow.

22 THE COMMISSIONER: Put forward
23 in relation to caribou. I think both pipeline companies,
24 environmentalists and the native organizations all
25 found something in your work that they feel good
26 about, so we looked forward to hearing from you and you
27 didn't let us down. We certainly enjoyed it and bene-
28 fitted greatly from it. I'd like to thank all three
29 of you, and I have the feeling that we may not be
30 seeing any of you again. It's entirely possible that

Calef, Lent, Bergerud
Cross-Exam by Ryder

1 everything that's been said about caribou that could
2 possibly be said has. So we'll adjourn for a minute or
3 two and then you could put up your next witness.

4 (WITNESSES ASIDE)

5 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

6 (ALASKA CONSERVATION REVIEW, SUMMER/FALL 1975

7 MARKED EXHIBIT 405)
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1 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)
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3 THE COMMISSIONER: All right,
4 we will come to order.

5 MR. RYDER: Mr. Chairman, I would
6 like to introduce to you and to the Inquiry, Dr. Gordon
7 Davies who has for some time been assisting in a
8 consulting fashion Commission Counsel with respect to
9 biological issues and he has prepared evidence which
10 has been distributed to counsel as required, and I believe
11 has been filed as an exhibit, has it not?
12

13 GORDON DAVIES, sworn:
14

15 DIRECT EXAMINATION BY MR. RYDER:

16 Q Dr. Davies, and I am referring
17 you now to the copy of your prepared text, does the
18 sheet attached to the prepared evidence that you have
19 with your name at the top of it accurately describe
20 your academic qualifications and your experience?

21 A Yes, it does.

22 Q And perhaps you might read
23 that into the record.

24 A Yes, thank you. I have a
25 degree in Physical Education and Recreation which I
26 thought probably would be irrelevant to the proceedings
27 at this Inquiry, but I must admit that it came into some
28 limited use last night.

29 Q You were demonstrated as a
30 relic athlete.

A Thank you, Mr. Ryder.

G. Davies
In Chief

1 I also have a Bachelors Degree from the same university
2 in zoology, that university being British Columbia, and
3 I have a masters degree in zoology from the same
4 university and subsequently in 1970 I received a
5 PhD in ecology from the University of California.

6 Presently, I am the manager
7 of the Ecological Studies Division of James F. MacLaren
8 Limited which is a relatively large Canadian firm of
9 consulting environmental scientists and engineers.
10 After receiving my PhD. I received a post as Assistant
11 Professor in ecology in the Man - Environment Studies
12 Department at the University of Waterloo. There I
13 was appointed the Associate Chairman of the department in
14 1973, and while there I participated in a number of
15 environmental studies in creating an appraisal of
16 social and environmental problems arising from the
17 pending industrialization of the shoreline of Lake
18 Erie of Haldimand and Norfolk counties. I also prepared
19 a report on environmental planning and protection
20 activities in Canada for the Environmental Protection
21 Service of the Department of Environment. I was consul-
22 tant to the Task Force on Environmental Impact Policy and
23 Procedure, particularly looking at problems related
24 to policy formulation and public administration and this
25 effort was also on behalf of the Department of the
26 Environment.

27 I prepared with a colleague,
28 David Fischer an economist, an environmental management
29 seminar stressing environmental impact assessment
30 problems and procedures and this was sponsored by a variety

1 of governmental inter-agency groups and presented in
2 Madrid, Copenhagen and Utrecht.

3 I presented a similar workshop
4 in Tokyo, a similar environmental management workshop
5 with the same colleague for the Ministry of Construction,
6 and at that workshop we specifically developed an
7 approach to assess the environmental impact of large-
8 scale water resource projects, new town developments
9 and highway projects, and there are a number of other
10 similar types of experiences which I have documented on
11 my resume which is found in the prepared evidence.

12 THE COMMISSIONER: Do you have a
13 copy? I think that we better adjourn at noon today,
14 Mr. Ryder. I don't think that we are equipped to function
15 much longer.

16 A For the last five years
17 I have been involved rather intensively with the
18 Federal Government in looking at the formulation of
19 impact assessment policy and procedure and more recently
20 particularly in the area of the development of the
21 approaches to assessing environmental impacts.

22 Q And to turn the page I
23 take it that the publications and invited papers are
24 your responsibility, your shared with responsibility
25 with one of your colleagues?

26 A Yes, that is correct.

27 Q Now, would you describe
28 for the Commission your current involvement with the
29 environmental impact assessment work?

30 A Yes, as manager of the

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In Chief

Ecological Studies Division of James F. MacLaren Limited,
I am responsible for the quality of the biological
work done by the firm and provide direction for an
interdisciplinary team of biologists, geographers
and planners engaged in environmental impact analysis.
As a project manager or environmental co-ordinator, I am
responsible for integrating the efforts of a much
wider variety of specialists, including economists,
engineers, landscape architects, geologists, sociologists,
and anthropologists.

In particular I am responsible
for the incorporation of ecological information into the
assessment process and for the development of an
appropriate assessment methodologies. Since joining
the firm in July, I have been involved in several
environmental studies, including the site selection and
environmental impact evaluation of an uranium-hexafluoride
refinery, the location and environmental impact
evaluation of a resource recovery plant, the site
selection for a federal fisheries fish culture station, and an
analysis of the impact of once-through cooling systems
of thermal generating stations on fish behaviour and
physiology.

Many of these studies will go
before the Province of Ontario's environmental
Assessment Board. Others will be reviewed under the
auspices of the federal government's environmental
assessment review process. In either case I will be
expected to show how our client has complied with
the guidelines provided for preparing the environmental

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In Chief

1 impact statement as well as providing expert testimony
2 on the ecological aspects of these studies.

3 Because of the relatively
4 large volume of our work, we are in constant consultation
5 with environmental regulatory agencies at the provincial
6 and federal level and are familiar with the evolving
7 assessment processes.

8 Q Can you describe for us
9 the state of the art of environmental impact assessment
10 in Canada now?

11 A Yes, the state of the
12 art is evolving very rapidly in Canada, and although
13 formal programs are just now being implemented, many
14 agencies have actively been developing staff, technical
15 methods and procedures, with the goal of integrating
16 environmental factors into their programs from planning,
17 through to construction, operation and maintenance.

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In Chief

1 The Ontario Ministry of
2 Transport & Communications has been involved in such
3 a program since 1971, and has a well-developed approach
4 to environmental assessment which includes public
5 participation throughout. My following remarks will
6 be confined to a description of the Federal Government's
7 assessment process, and that of the Province of Ontario.

8 I'd like to acknowledge that
9 I've freely "cribbed" many of my remarks on the federal
10 assessment process from a speech made to the Association
11 of Consulting Engineers of Canada on October 23, 1975,
12 by Dr. R.R. Logie, who is the chairman of the Environ-
13 mental Assessment Panel, Environment Canada.

14 Now the Federal Government of
15 Canada, by virtue of a Cabinet decision on December 20,
16 1973, has instituted an environmental assessment and
17 review process. In this process, unfortunately but
18 inevitably it has become known by its acronym EARP,
19 a sound which some critics have suggested summarizes
20 very aptly the current state of the art. In any case,
21 the process is designed to assess the environmental
22 effects of federal projects. Federal projects are
23 defined as those meeting any one of the following criteria:
24 (1) Sponsored or initiated by Federal Department or
25 agency.

26 Q Dr. Davies, I wonder if
27 I could ask you to slow down? The reporters would have
28 an easier time in transcribing your words.

29 A Thank you, I'll do that.
30 Sorry. I'll just backtrack.

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Federal projects are defined as those meeting any one of the following criteria.

- (1) They are sponsored or initiated by a federal department or agency.
- (2) Refers to projects which are funded in whole or in part by a federal department or agency.
- (3) Would describe projects involving the use of federal lands or properties.

Now the Cabinet decision asked all federal departments to take into account the environmental effects of their projects early in the planning process. If the agency decides these effects may be significant, they will conduct a preliminary impact assessment. If the decision is that the project's effects are not significant, then the agency will proceed with the project. At the conclusion of the initial environmental evaluation, the proponent may decide that there are significant environmental effects and the project is referred to the Department of the Environment, for review.

A sequence of events is then initiated which includes the following steps:

- . An environmental assessment panel is appointed and this panel is responsible for issuing guidelines which act as terms of reference for the preparation of an environmental impact statement.
- . The proponent of the project and/or his consultant prepares the environmental impact statement.
- . The environmental assessment panel then reviews the environmental impact statement, using any government

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In Chief

1 expertise it chooses. The environmental assessment
2 panel ensures that the public has access to the environ-
3 mental impact statement and obtains their comments.
4 Then the environmental assessment panel recommends to
5 the Minister of the Environment whether the project
6 is to stop, go, or be modified.

7 Now the decision on the
8 recommendation will be made by the Minister of the
9 Environment in consultation with the minister of the
10 proponent agency. Finally, the ministers are then
11 responsible for giving notice of any modifications
12 required of the environmental design.

13 Now in Ontario the Provincial
14 Legislature passed the Ontario Environmental Assessment
15 Act on July 14, 1975. When this Act is proclaimed, it
16 will make environmental assessments mandatory for
17 a variety of projects. The governments plan for a
18 phased application of the Act, which means that
19 early in January of 1976 environmental assessment will
20 be mandatory for government projects. By July of 1976
21 the Act will also apply to municipal projects, and
22 sometime in 1977 the private sector will also be
23 affected by the Act.

24 The Minister of Environment
25 can require the private sector to prepare an environ-
26 mental assessment statement if, in his judgment,
27 the project is a major one with significant environmental
28 impacts. Certain provincial entities such as the
29 Ministry of Transport, have voluntarily subjected their
30 projects to an environmental review process for the

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In Chief

1 past four to five years. Some members of the private
2 sector, notably pulp and paper companies, have also
3 submitted their development plans for similar scrutiny
4 because they have found that it shortens the time
5 required to gain technical approvals.

6 The environmental assessment
7 process in Ontario is similar to that of a Federal
8 Government. I do not propose to go into any detail
9 here. Suffice it to say that

10 (1) the appropriate regulatory agency issues environ-
11 mental guidelines for the projects.

12 (2) the proponent of the project prepares an environmen-
13 tal impact statement which meets the requirements of
14 the guidelines.

15 (3) the adequacy of the statement is then reviewed by
16 the Minister of the Environment.

17 (4) if the statement is not adequate, the proponent
18 may be asked to revise it or do further studies and
19 submit the new statement.

20 (5) if the statement is considered adequate, a decision
21 may be made on the acceptability of the project. If
22 the project is likely to have major significant effects,
23 the Minister may not make a decision but refer this
24 responsibility to an Environmental Assessment Board,
25 which is appointed by the Lieutenant-Governor in
26 Council

27 (6) the public is actively engaged in the review process
28 and may in fact institute a request for a public hearing.

29 I would like to underscore
30 two major differences now between the federal and

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In Chief

1 provincial assessment systems:

2 (1) The Ontario system will ultimately apply to
3 other than government projects. In other words,
4 Mr. Commissioner, the private sector is also involved.

5 (2) There is an explicit means of public involvement
6 in the Ontario scheme. At the federal level, public
7 participation is left to the discretion of the concerned
8 Ministers.

9 Having compared these two
10 assessment systems, as briefly as I have, I would now
11 like to clarify the meaning of two terms. The environ-
12 mental assessment report and the environmental impact
13 statement. In accordance with current Federal Govern-
14 ment thinking, the environmental assessment report
15 would be produced at the end of the assessment process,
16 and would contain a judgmental decision that the environ-
17 mental implications of implementing a project are or
18 are not tolerable to society. The environmental
19 impact statement is one of the tools, probably the most
20 important one, I think, used in arriving at the decision
21 and is essentially a statement of the proposed under-
22 standing of the environmental losses which will accrue
23 if the project is in fact implemented.

24 Q Now, from the number of
25 environmental impact statements that you have examined
26 can you give us an impression of your view of their
27 adequacy or inadequacy as decision-making tools in the
28 assessment?

29 A Well, the environmental
30 impact statement contains a statement of the proponent's

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1 knowledge concerning the technical and cost aspects of
2 the project, the anticipated environmental impact if
3 the project is implemented, and the good housekeeping
4 procedures that will be followed to minimize these
5 impacts, in a statement of unavoidable losses. This
6 statement, taken along with the public's view or views
7 on the project, is really the cornerstone or should be
8 in a decision-making process.

9 If this statement is incomplete,
10 confusing or inadequate in any way, the decision that
11 is taken will be less than optimal. You might ask what
12 sort of decision will be made if the statement is ade-
13 quate, but the public views on the other hand are con-
14 fusing and conflicting. A simple answer, of course, is
15 that chances for an optimal decision are once again
16 diminished. But a simple answer won't do here because
17 what is happening, I think, is that the environmental
18 assessment process and not the environmental impact
19 statement is at fault. I think if the public has
20 been involved actively by participating actively or
21 passively during the planning processes, chances for
22 confusion are minimized. Infact this sort of engagement
23 between the proponents, the regulatory agency and the
24 public, may lead in fact to an increased polarization
25 of public views. In this latter situation, though
26 not exactly utopian, is, I suspect, the best sort of
27 climate for decision-making.

28 It means that the decision-maker
29 is in a much better position to predict both the short
30 and long-term political implications of a decision for

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1 himself, for party and for country. The political
2 implications of initiating or stopping a given project
3 are unfortunately not documented nearly as well as
4 the environmental implications, or at least if
5 they are, they are not really available to public
6 scrutiny. However, concerning ourselves with the
7 environmental impact statement, there are many current
8 problems with environmental impact statements and they
9 have been dealt with extensively in some of the
10 publications and reports that are listed in Appendix
11 "A".

12 There are five major problems,
13 I think, and they can be summarized as follows: Most
14 environmental impact statements are prepared in response
15 to guidelines, which themselves are in an embryonic
16 state of development. I think as the regulatory
17 agencies gain more experience, the guidelines will
18 inevitably improve. The environmental impact statement
19 will only be as good as its guidelines since really
20 these act as terms of reference for the studies.

21 No. 2, the statements often
22 contain vast amounts of information, much of which
23 is irrelevant and makes the review process laborious
24 and time-consuming. Now, Mr. Commissioner, one of
25 yesterday's witnesses suggested that a considerable
26 sum of money has been spent in the preparation of
27 environmental studies, both by the applicants here
28 and the Government of Canada, and it was sugges-
29 ted, I think by yet another one of them that even
30 doubling that budget wouldn't in any way significantly

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1 improve the capabilities of this Inquiry to judge the
2 impacts of the pipeline on the environment or help for
3 that matter the applicant to improve his capability,
4 that is of making an environmentally sound pipeline.
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1 I think that is true, but I
2 think that the more important point to make here is
3 that it is entirely possible that you could have
4 halved the budget, because it is not the quantity of
5 data that is really so important, it is the kind of
6 data that is collected, when it is collected, where it
7 is collected, and finally, and this is really the
8 thrust, I think, of the balance of my presentation, how
9 it is presented and analysed. That is really important.

10 Number three, the statements
11 are often incomplete in that many impacts are not
12 considered and this is particularly true of induced or
13 indirect impacts which I think have often in the course
14 of this Inquiry, have been referred to as secondary
15 impacts.

16 Number four, most impact studies,
17 and therefore their accompanying statements reflect a
18 curious state of affairs, at least from my point
19 of view, and it is that our scientists have gathered
20 data in the field which will allow them to tell us
21 what is where and when, but they seem unable to tell
22 us much about the sensitivity of the systems we are
23 interested in. This was pointed out yesterday by one
24 of the witnesses. For example, in this Inquiry, we
25 have a reasonably good notion of when and where to
26 look for Arctic char, and we even know that like all
27 fish, they are susceptible to damage by increased
28 levels of suspended or settled solids. What we don't know are the
29 answers to a number of specific questions concerning
30 critical levels of suspended solids for different age

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1 classes, for example, different seasons. We don't
2 no in any quantitative sense how the construction of a
3 pipeline will affect these levels and to what extent
4 we can control them, and it seems to me that a comprehen-
5 sive set of experiments which could have been done at
6 a reasonable cost would have provided answers to questions
7 like these.

8 Number five, it is obvious from
9 even a cursory review of the environmental impact state-
10 ment literature, that most proponents only pay lip
11 service to the concept of alternatives. This is in spite
12 of the fact that in some jurisdictions it is mandatory
13 to consider alternatives, and these alternatives
14 sir, can be locational, or structural -- by structural I
15 mean alternatives not of the same project type, for
16 example, instead of a pipeline, a railroad or some
17 other means of shipping gas, or you can even have, of
18 course the no project alternative.

19 Q You have demonstrated for
20 us the utility of the environmental impact statement,
21 but the concern of this Inquiry is to be sure that if
22 either of the projects described in the application are
23 implemented that all possible steps be taken to minimize
24 the environmental disruption. Now, what do you think
25 are the most important measures that can be taken to
26 minimize environmental damage?

27 A Well, these measures fall
28 into three broad categories: those concerned with the
29 location or siting of the project; those which we can
30 call, I guess, environmental engineering, and these are

design features or
1 devices which attempt to minimize environmental
2 disruption; or the ongoing monitoring or surveillance
3 programs which are carried out during the construction
4 and operation of the project.

5 Q Is any one of these
6 measures more important than the other?

7 A Well, they are all important,
8 of course, but in the case of the applications before
9 the Commission, the most important measure in
10 minimizing environmental damage, and I think that
11 this applies to physical, biological or social damage,
12 if I can use that expression, is corridor, or route
13 selection. Environmental engineering and monitoring,
14 or surveillance programs are important, but not nearly
15 as much so as corridor route selection. An analogy
16 can be made in the field of photography. Given a good
17 negative it is not only possible, but relatively easy
18 to obtain a good print. Given a bad negative no amount
19 of skill can prepare a pleasing print. Similarly,
20 given a good environmental route alignment and
21 engineering, we can produce a pipeline with minimal
22 environmental impact. But given a poor choice of
23 alignment, no amount of engineering will reduce the
24 environmental disruption to a tolerable level.

25 Q Do you think the applicants
26 in this Inquiry have treated the question of alternative
27 corridors and alternative routes adequately?

28 A No, and I realize that
29 there has been a great deal of discussion on this
30 topic, and so to minimize the potential for boredom here,

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1 I have summarize my concerns on this topic in Appendix
2 B which is attached to my prepared evidence and they
3 are concerns, of course, which have been voiced by
4 others throughout this Inquiry.

5 Now, I think that I would like
6 to read just, however, the types of concerns and you
7 can see in that appendix that I have documented reference
8 throughout the transcripts. The concerns that I see
9 are these:

10 First of all, there has been
11 no systematic process for selecting the corridors.
12 Secondly, the corridors selected were evaluated on
13 the basis of unequal data. Thirdly, no systematic
14 methodology was used in route selection, that is, a
15 method which would make it explicit to selection
16 criteria and explain the nature of the environmental
17 tradeoffs. Four, the timing of some of the social and
18 environmental studies suggest that they are to be
19 used to justify selections based solely on economic
20 criteria. Five, the sociological impact of the
21 pipeline may be the most critical factor which should have
22 been used to locate it, yet at no time were the public
23 involved in any meaningful way to help choose a route.

24 Six, the Mackenzie Valley Highway
25 has had an obvious influence in shaping the Mackenzie
26 Valley transportation corridor and likely the routing
27 of the pipeline, and if true, this would be most
28 undesirable because it seems likely the highway was
29 located in haste and without the benefit of detailed
30 environmental studies.

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1 Those are the concerns in general
2 and I think these are documented, as I said earlier,
3 in the appendix.

4 Q I see the balance of
5 your appendix goes on to document each of the
6 areas of concern that you have listed for us.

7 A Yes, that is correct.

8 Q Now, I understand that you
9 are going to discuss the method which can be used for
10 selecting and evaluating corridors of routes within
11 corridors and methods for evaluating environmental
12 tradeoffs. Of what possible use is this information
13 to the Inquiry at the stage we are now in?

14 A Well, there are still
15 important decisions to be made in this area. I think,
16 for example, that neither the pipeline companies nor
17 any other participant in the hearings can say on the
18 basis of the present methodology used that any one of
19 the routes still under consideration is to be preferred
20 over any other. If either one of the applicants were
21 to use a procedure or a procedure similar to the ones
22 which I shall describe, then it will be open to the
23 Inquiry and to the country at large, including the
24 Cabinet, to see how the decisions were made and debate
25 them.

26 Q Is there any generally
27 acceptable method for doing corridor and route selection
28 studies?

29 A Well, there is no one
30 method. Several approaches have been tried here and in

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1 the United States, and I have filed examples of these
2 studies with the Inquiry and they are listed in
3 Appendix C which is attached to my prepared evidence.

4 Q And these, I take it,
5 Dr. Davies, have been filed with Miss Hutchinson as an
6 exhibit?

7 A Yes.

8 These studies are concerned with
9 a variety of facilities including highways, trunk
10 sewer lines, and transmission lines, but the methodolo-
11 gies developed in them are equally applicable to the
12 location of gas pipelines.

13 Now, a generalized corridor
14 and route selection process can be synthesized from
15 these above studies and this is what I would like
16 to present here. I did intend originally to use
17 slides at this juncture, but I think that I will just
18 try and talk this part of the evidence in without the
19 benefit of the slides.

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1 First, corridor development
2 as set by a multi-disciplinary team and these
3 objectives include economic contractors, engineering
4 design factors, resource requirements, social environ-
5 mental factors, land acquisition considerations, and
6 so on. A number of alternative corridors selected,
7 and this is a complex and important activity re-
8 quiring creativity and imagination as well as sound
9 technical knowledge. The success of the feasibility
10 studies is very much dependent on this phase of the
11 planning process, and it's important to realize the
12 proposal ultimately suggested cannot be better than
13 the best of the alternatives developed.

14 These alternatives should be
15 developed in harmony with the formulated objectives and
16 should be capable of fulfilling most, if not all, the
17 project's functions.

18 Now the project team, which
19 I should add is a multi-disciplinary team, of course,
20 develops a general definition of the study area and
21 produces a list of data requirements for environmental
22 inventory. A data basis is developed of the study
23 area, using existing information. The data typically
24 presented on maps in terms of surficial geology, land
25 forms, drainage, soils, biological features, existing
26 land use, and so on. The alternative corridors are
27 assessed as regards their capability to support the
28 proposed activity. On the basis of available informa-
29 tion it will be possible to eliminate one or more
30 corridors by regard to severe technical

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1 constraints, severe environmental constraints, severe
2 social constraints, or perhaps severe cost constraints.

3 Now preliminary reconnaissance
4 or on-site inspection is made by highly qualified
5 representatives of all disciplines which are to have a
6 say in the selection process.

7 Q Stopping there, Dr. Davies,
8 do I take it that before you make your preliminary
9 reconnaissance all your other work takes place in your
10 office?

11 A That's correct.

12 Q Not in the field.

13 A That's right, it's an
14 office exercise and you get all the available informa-
15 tion together first and see what can be done to first
16 of all generate the idea of the corridors, and then
17 secondly possibly eliminate some of them.

18 Q So you use existing
19 information as opposed to seeking additional data? .

20 A That's correct; and then
21 at that point you may or may not eliminate any of
22 the corridors. But in any event, you then follow through
23 with this reconnaissance or on-site inspection, and I
24 think the important point to emphasize is that it's
25 done by highly qualified personnel.

26 Now at this stage, that is
27 after you've completed the on-site inspection, you
28 should be able to decide whether there is a corridor
29 that's feasible or appears so, having regard to techni-
30 cal, biological, social, and cost factors, and you

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1 also may be able to decide at this stage which is
2 the preferred corridor. In other words, you've
3 really reached a decision point. If you cannot come
4 up with the preferred corridor, you may at that point
5 want to generate a limited field program to get
6 sufficient information to finally make a decision on
7 that corridor.

8 Q In the case before us,
9 the applicants have been instructed that the Government
10 of Canada will entertain applications for a right-of-
11 way permit for a gas trunkline in the Mackenzie Valley
12 corridor. Given that constraint, isn't what you are
13 saying about corridor selection irrelevant?

14 A No. It's untimely but
15 it's certainly not irrelevant, and I think from some of
16 the evidence we heard yesterday the question of corridors
17 doesn't seem to be entirely dead anyway. From my
18 point of view, though, the importance of talking about
19 corridor selection is that you can't separate it from
20 route selection. The two are integrally related.

21 Q Would you now tell us
22 about the route selection process?

23 A Well, the selection of
24 routes within corridors is of special interest to the
25 Inquiry. It usually requires the development of a
26 considerably more detailed data base and more comprehen-
27 sive analysis. I think there are three general ways
28 of selecting routes. The first way of selecting a
29 route I'd like to consider is that the engineering staff
30 of the proponent selects a series of routes which are

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1 considered technically feasible. The environmental
2 and social experts retained by them select a preferred
3 route from the choice offered by the technical staff.
4 The selection process is done by a method of measuring
5 the various concerns and trading one off against the
6 other. Where two routes are relatively equal, the
7 final selection is usually done on cost grounds.

8 Note that in this method the
9 initial choice is made by the engineering staff, and
10 the social and environmental aspects are merely respond-
11 ing to a series of routes already selected by the
12 technical people. They're reactive.

13 The second method permits
14 experts from all disciplines to play a role in the
15 selection process and proceeds as follows. Each of the
16 experts familiarizes themselves in detail with the
17 particular characteristics of the corridor for their
18 disciplines. Each discipline then creates a set of
19 criteria for routing which responds to the particular
20 problems of their own discipline, and then each disci-
21 pline quite separately prepares a preferred route.

22 A series of meetings is then
23 conducted in which the preferred routes of each
24 discipline are mapped, one overlaying the other, and
25 this process enables you to identify the areas of
26 conflict and the areas where no conflict exist. The
27 conflicts are then resolved by a method of handling the
28 tradeoffs which will be discussed later.

29 Now a third way of selecting
30 routes is to have each expert plot the areas of constraint

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1 imposed by his discipline. For example, the biologists
2 will outline on a map the areas to be avoided for
3 biological reasons. The social scientists will do the
4 same for socio-economic reasons, and the engineering
5 staff will do the same for technical reasons. This is
6 mapping in which the areas of constraint are overlain
7 and an attempt is made to draw a route which avoids the
8 constrained zones as much as possible. This method,
9 of course, will also result in certain areas of conflict
10 which cannot be avoided and the selection of these
11 areas lead to the problem of handling and evaluating
12 tradeoffs. I think the important distinction though
13 that we make here is that the second and third methods
14 are not reactive. Each discipline plays a positive and
15 creative role in helping select the route.

16 Q You have described the
17 steps you think are important in selecting alternative
18 corridors and alternative routes, but you haven't
19 provided us with the mechanism for choosing between them.
20 Are you able to do that for us?

21 A Yes. I've summarized a
22 number of route evaluation procedures in Appendix "D"
23 which is appended to my prepared evidence, and these
24 methods or modifications of them have been success-
25 fully used in a number of studies.

26 The procedures which I will
27 review with you will reflect what I believe to be a
28 trend in Ontario, at least, for its numerical rating
29 based on subjective comparative values. It is pointed
30 out by W.H. Mathews in a paper tabled earlier in these

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1 proceedings, and I quote:

2 "The analysis of environmental impact requires
3 both objective and subjective judgments at almost
4 every stage, and that if these two types of
5 judgments are confused in the mind of the analyst,
6 or in his final product, then the effectiveness
7 and even the credibility of his work will be
8 seriously compromised."

9 Now, Mr. Commissioner, I propose at this point to use
10 slides to illustrate some of the methods which have
11 been used for evaluating either corridors or routes.

12 For the methods which I'm
13 about to discuss I'm relaying on an in-house review
14 prepared by the Ontario Ministry of Transport, and
15 also a number of reviews prepared by myself. Each
16 of the methods that follows can be applied to the
17 evaluation of either corridors or routes and they
18 proceed in order of very simple approaches through
19 to approaches which are more complex.

The first method is the so-called choice method, and it is the simplest form of an evaluation matrix, and it has, as you can see, down one side of the matrix, a listing of objectives, each row heading contains an objective for the corridor or route. Each column heading, as you can see, lists the alternatives by name: A,B,C, and so on, and the scoring is performed for this evaluation procedure by marking an "X" for the alternative with the highest objective achievement, and this procedure is repeated for all of the objectives, and so that you can see, for example, Objection 1, apparently Alternative A in this hypothetical example, had the highest objective achievement and so it is given the "X", and no other alternative gets any scoring at all.

For Objective 2, Route B apparently has the highest level of objective achievement and it is scored accordingly; and the alternative with the highest number of "X"-marks is considered the best. Now, although simple, this method does not consider the second highest and third objective achievements and, therefore, the result obtained by summarizing only the highest scores may be somewhat inflexible and misleading. You can imagine, for example, that Route B may only be ranked as having the highest level of objective achievement for one of those objectives, yet in actual fact it may get the second highest objective achievement for every other objective. On the other hand, Route A could perhaps get two or three top scores, and yet, in all other instances, rate very low,

1 and so this kind of inflexibility in the system makes
2 it not a terribly desirable one.

3 The second method is called the
4 ranking method. This procedure is slightly more
5 time consuming because each alternative is scored by
6 indicating its objective achievement in the form of
7 ranks. You can see the matrix set up is just about
8 the same as the earlier one. You have the row headings,
9 areobjectives for the corridor, the route, and the
10 column headings are the various alternatives that you've
11 selected. The ranking 1,2,3,4, and so on is carried out
12 by assigning one to the highest, two to the second
13 highest objective achievement and so on. So I think you
14 can see that this method is better than the choice method.
15 The effectiveness, or some of the ranks of the best
16 alternative has the lowest numerical value while the
17 highest number indicates the worst alternative. It should
18 be pointed out here that this method treats objectives
19 of equal importance and this is an unrealistic feature
20 of this approach.

21 The third method, it is called
22 the rank based value method matrix approach, and this
23 method is similar to the preceding ranking method both
24 in concept and application. The improvement consists of
25 following two requirements which must be carried out
26 beforehand, though. All of the objectives which are
27 "n" in number, instead of being weighted, are ranked in
28 order of their importance. In other words, your
29 experts are asked to say how much more important is
30 objective one, or less important, than any other

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1 objective, and then each objective is then assigned a
2 rank of n , n minus 1 and so on, in descending rank
3 order, so the highest rank is the best or the most
4 important, sorry, objective.

5 Now, the second difference is
6 that a probability of implementation factor " P " is
7 assigned to each alternative and the estimation of
8 this factor is done either on a subjective basis or
9 is based on a gain/loss analysis. So, this one is a
10 little complicated to read, but, Mr. Commissioner, if
11 you look in the top column you will see a diagonal
12 slash. Above there we are asked to consider that there
13 is a probability of implementing any one of these routes,
14 and by ^{one} several methods the experts on your panel will
15 provide what that probability is and it is placed in
16 the box at the top of each column for each alternative.

17 Now, all the alternatives m
18 in number are ranked in the order of objective
19 achievements and assigned a value of m or m minus
20 1, etc., in descending rank order, and then an
21 effectiveness score is calculated for each alternative,
22 and it is determined by summing the products of n ,
23 that is the probability of implementing the route,
24 times m times P for each objective.

25 I misread that, Mr. Commissioner,
26 I will repeat that. The effectiveness, V , for alterna-
27 tive is then determined by summing the products of
28 n times m times P for each objective, and in
29 this hypothetical evaluation here, for example, the
30 procedure shows that alternative C meets the developed

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1 objectives, because it has a highest score, or V score of
2 11.7.

3 These effectiveness results give
4 a good indication of the relative value of different
5 alternatives in terms of achievement of the stated
6 objectives. But it must be understood that the final
7 results are controlled by three subjective rankings
8 which are involved in the total process.

9 Now, I would like to digress
10 here just for one minute to say that it is very difficult
11 to get experts to use these kinds of approaches at
12 this point because they require a certain amount of
13 effort, and there is also a certain amount of
14 suspicion involved on the part of the experts that,
15 you know, that are assigning a number to something
16 based on their subjective judgment, but I think this
17 sort of holding back on the part of the experts is a
18 very serious sort of mistake, because in our work in our
19 firm, for example, we have found that if we intuitively
20 discuss a project and come to some consensus among
21 us, for example, which is the best of the many alternatives
22 that we are considering, that we often get a substantial
23 surprise when we go through an evaluation procedure
24 similar to these because we quite often come up with
25 completely different alternatives, instinctively which we,
26 you know, thought was the appropriate one, and so the
27 exercise is well worth the effort.

28 The next method is known as the
29 appraisal method matrix and in addition to the simple
30 rating system which you just saw, this method reflects the

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1 community valued objective preferences in the form of
2 relative weights and applies these weights as a function
3 of the objective efficiency. All of which means here
4 that you weigh objectives and you can see the
5 weighting scores in the second column and in many
6 instances agencies, for example, like the Ministry of
7 Transport in Ontario which have used this approach
8 formed several appraisal teams, an expert appraisal
9 team from the ministry itself, an outside or consultant
10 expert team, and in many cases a public appraisal team
11 and I think that this approach is an extremely valuable
12 one because you see that different groups have
13 different preferences, and accordingly when they
14 prepare their environmental impact statement, these
15 different weights and sometime the different decisions
16 that can be arrived at are made explicit to the
17 decision maker, and so ultimately since the decision
18 is a political one, it becomes more obvious to the
19 decision maker what the results of any one of his
20 decisions are going to be.

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1 We pointed out that the
2 evaluation of each alternative is based on the subjective
3 assessment of achievement of each objective, and
4 this objective measurement may be one of the deficiencies
5 of this method as it has ^{/of} any of the others.

6 Under each alternative you can
7 see that there are two column headings, we have
8 "objective achievement" and then "objective efficiency".
9 It has to be determined beforehand that there is a
10 rating scale to determine whether or not any given
11 alternative meets any stated objective. Now the
12 particular example we're using here just uses the three
13 point rating system. For example, if you see a plus 1,
14 for any of those alternatives under "objective efficiency"
15 it means that objective achievement is enhanced. If
16 you see a minus 1 under "objective achievement" it
17 means that the objective achievement is decreased.

18 On the other hand, if you see
19 a zero, it means that the objective achievement is
20 unaffected for that particular alternative.

21 Now the objective efficiency,
22 which is the second column heading under each alternative,
23 is calculated simply by multiplying the objective
24 achievement by the weight, which has been determined by
25 the particular project team. Then the effectiveness of
26 each alternative can then be decided by summing the
27 objective efficiencies. And the alternative ^{/with} the highest
28 positive score is the preferred alternative.

29 One problem with this approach
30 is that if the objective achievement is enhanced, the

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1 degree to which this enhancement occurs may vary with
2 each different alternative and this may require addi-
3 tional evaluation. When you see a plus 1 you don't
4 know if the achievement is so-so, or if it's achieved
5 to some ultimate degree.

6 The next method is a rating
7 method and with this method ^{the} list of specific objectives
8 must be weighted to establish the relative importance,
9 and a rating procedure pre-selected to determine the
10 attainments of each objective. A typical matrix may
11 be used to evaluate the various alternatives. You can
12 see it here before you. In this particular case the
13 point rating scheme is based on a scale from 1 to 10
14 and the achievement rating of each objective is multi-
15 plied by the objective weight, producing objective
16 efficiency. The sum of all the objective efficiencies,
17 which is the weighted rating, determines the effectiveness
18 of each alternative.

19 While the values obtained are
20 not given identifiable units because of their subjective
21 nature in the ratings of some objectives, they do
22 provide an accurate indication of the relative worth
23 of each alternative. However, it should be noted that
24 one evaluation procedure, no matter how good, gives only
25 a one-sided view of evaluation and must be supplemented
26 with additional and more refined evaluation of issues.

27 Now the above methods are
28 easily adaptable to a variety of projects. These methods
29 establish the effectiveness of each alternative based
30 on the attainment of the total list of objectives for

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1 the project. The evaluation of each alternative,
2 according to the effectiveness of each separate issue,
3 is therefore masked. Consequently these methods
4 must be supplemented with additional evaluation procedures
5 and the cost effectiveness method described below is
6 one of several approaches which could help solve this
7 problem.

8 The cost effectiveness method
9 compares the effectiveness of each alternative with the
10 corresponding costs and the effectiveness can be
11 determined here with any of the preceding evaluation
12 methods, and expressed as percent or other form of ind-
13 ication. The cost effectiveness can be evaluated either
14 through the total list of objectives or for a specific
15 group, depending on the evaluation needs. A typical
16 graph may be developed as shown in the figure below
17 which shows cost on the one axis and effectiveness on
18 the other. Instead of radiating lines which you see
19 indicates the performance of each alternative, and .
20 thus provides an evaluation base from which a decision
21 could be rendered with greater certainty.

22 Well, the above evaluation
23 procedures require that scoring techniques be developed
24 for measuring objective attainment. We've all along
25 talked about objectives for the route, whether or not
26 a given route meets these objectives, but how do you
27 score whether or not a given alternative meets the
28 objectives? Once formulated these techniques may be
29 used to convert measured and predicted performances into
30 equivalent worth scores, and the following are just a

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1 few examples of the kind of techniques that are used
2 in formulating scoring functions.

3 This is the wrong slide. Thank
4 you. Here is a relative scoring technique, now remember
5 the relationships between these scoring techniques.
6 These are where the numbers come from that fit in the
7 little boxes in the matrices. This is the simplest
8 way of scoring. The best alternative for the highest
9 objective --

10 THE COMMISSIONER: Excuse me,
11 scoring in terms of each objective?

12 A That's right. The
13 best alternative for highest objective attainment
14 receives the full number of points and the worst
15 alternatives receive no points. Each other alternative
16 receives a number of points that are linearly proportion-
17 al to the best and worst alternative, and if you
18 look at the figure on the screen you'll see for
19 example considering alternatives for highway extension
20 length on five different alternatives. Alternative A
21 has an extension of eight miles. Alternative B has an
22 extension of seven miles. C, which isn't labelled
23 on the graph, I see, has an extension length of six
24 miles. And D and E have lengths of five miles. Now
25 the objective being here to extend service in the
26 corridor, this is the objective of this particular
27 project.

28 Alternative A rates the
29 highest with eight miles, and receives say on a
30 scale from zero to 3, three points.

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Alternatives D and E, according to this approach, each get zero points, as they are the shortest, with five miles each.

Alternative B gets two points, since it is $2/3$ of the way from worst alternative to the best.

Similarly, alternative C, which is not marked there, receives one point.

One shortcoming of the above described relative scoring technique is that the best alternative gets a full score, even though it may be far from perfect, and the worst alternative gets zero, even though it may be almost as good as the best alternative.

Another shortcoming is that a later addition or a new alternative with the worst or best performance invalidates the original points that have been attached to the earlier alternatives.

We can back up now to the previous slide. This is a linear utility curve which has been developed. Under this technique it may be decided that a ten-mile extension is the ultimate and should be worth three points, while building no extension should be the zero point. The figure that you're looking at shows the point distribution for each alternative and so the straight line which you see here then shows that A under this system would get

2.4 points; B would get 2.1 points; C -- 1.8 points; and D and E 1.5 points each. Addition of new alternatives under this technique does not change

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1 the original points attached to the alternatives
2 considered earlier.

3 Now, next slide, please. The rela-
4 tionship represented in the slide we were just looking
5 at need not be a linear one. For example, the first
6 mile extension into the corridor may be more desirable
7 than the second and so on, until the marginal utility
8 approaches a zero point beyond a 10-mile extension.
9 So this figure really represents that kind of relation-
10 ship. I think this is the sort of situation that you
11 often get in linear facilities, not a linear relationship
12 at all but a curved linear approach.

13 There are pros and cons to
14 each of the listed techniques. The simplest to use, of
15 course, is the relative technique. It only requires
16 two points to be defined, and bypasses the need to
17 define the proper utility curve which may take many
18 different shapes. The utility curve approach which we've
19 looked at on the other hand, may be more difficult to
20 use, but ^{it} forces ^{the} planner to think in terms of the
21 complete range of an objective within which any of
22 the possible alternatives may lie.

23 It should also be pointed out
24 that some objective attainments might not be so easily
25 measurable. In this case it would be perfectly legitimate
26 to use quality judgment scale such as high, medium,
27 low, and convert these to the predetermined scoring
28 scale. In reality there is no reason why a mixture
29 of techniques could not be used for different objectives
30 if so desired, providing the scoring scale is common

G. Davies
In Chief

1 for all objectives.

2 It is not always possible to
3 measure levels of attainment on interval or racial
4 scales, nor is the measurement of achievement always
5 possible in an objective manner. It is possible, however,
6 to measure subjectively the degree of such attainment
7 among alternatives on an ordinal scale by ranking.
8 I do not propose to discuss the various scales that
9 can be used, as these are treated routinely in most
10 statistical textbooks.

11 Mr. Ryder , if you won't
12 ask me the question, I guess I'll just ask it to
13 myself.

14 Q Well, I didn't know
15 that you'd completed the slides that you needed for the
16 previous question. If you've done that, it's now
17 20 to one, Mr. Commissioner. This may be, as we're
18 entering into, as I see from the slide, into a different
19 subject matter, that is the one leading to the method
20 of approaching tradeoffs, it may be an appropriate
21 time to break for the morning.

22 THE COMMISSIONER: I think
23 that you want to get the plane at two, Dr. Davies,
24 so maybe in fairness to Dr. Davies we should stop, now.

25 Because I was sitting down
26 there I didn't realize how close we might be to the end
27 of your evidence in chief.

28 A There are some further
29 slides to go , I believe.

30 THE COMMISSIONER: Well, when

G. Davies
In Chief

1 Dr. Davies is back again he can be cross-examined
2 and the slides that you omitted earlier, you might
3 find some occasion in your cross-examination to --

4 A I'll bring those with
5 me.

6 THE COMMISSIONER: Yes, maybe
7 you would. You should bring these too, the ones that
8 you have used. Don't you think so?

9 MR. RYDER: Yes sir. I think
10 we should also perhaps provide you with a copy of the
11 prepared text.

12 THE COMMISSIONER: That would be
13 nice. So is that all the evidence for this week in
14 Yellowknife?

15 MR. RYDER: I expect it is.

16 THE COMMISSIONER : Well, we'll
17 adjourn then until ten o'clock Tuesday morning and / in Inuvik
18 we'll return to Yellowknife on Monday, March 15th at
19 one o'clock. Dr. Davies will be recalled for cross-
20 examination then or later on.

21 MR. RYDER: At that time, I
22 expect.

23 THE COMMISSIONER: O.K., well
24 thank you, doctor.

25 A Thank you.

26 (WITNESS ASIDE)

27 (QUALIFICATIONS, REPORTS RELIED ON & EVIDENCE
28 OF DR. DAVIES MARKED EXHIBIT 406)
29 (OPTIMUM PATHWAY MATRIX ANALYSIS, 1971, MARKED
30 EXHIBIT 407)

(TECHNICAL REPORT FEASIBILITY STUDY, JULY
1975 MARKED EXHIBIT 408)
(Q.E.W. GUELPH LINE TO HIGHWAY 20 TECHNICAL
REPORT MARKED EXHIBIT 409)
(REPORT TO MINISTRY OF ENVIRONMENT, PROVINCE
OF ONTARIO, MAY 1973 MARKED EXHIBIT 410)
(MANITOBA HYDRO ENVIRONMENTAL ASSESSMENT,
APRIL 1975 MARKED EXHIBIT 411)
(ONTARIO HYDRO TRANSMISSION LINE VOLUMES 1
& 2 MARKED EXHIBIT 412)

(PROCEEDINGS ADJOURNED TO JANUARY 20, 1976)

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MACKENZIE VALLEY PIPELINE INQUIRY

Government
Publications

IN THE MATTER OF APPLICATIONS BY EACH OF

- (a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS CROWN LANDS WITHIN THE YUKON TERRITORY AND THE NORTHWEST TERRITORIES, and
 - (b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS CROWN LANDS WITHIN THE NORTHWEST TERRITORIES,
- FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION, OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Inuvik, N.W.T.

January 20, 1976.

PROCEEDINGS AT INQUIRY

Volume 112

CANADIAN ARCTIC
GAS STUDY LTD.

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APPEARANCES:

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Mr. Stephen T. Goudge,
Mr. Alick Ryder and
Mr. Ian Roland for Mackenzie Valley Pipeline
Inquiry;

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Mr. Jack Marshall, and
Mr. Darryl Carter for Canadian Arctic Gas
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Mr. Reginald Gibbs, Q.C.,
Mr. Alan Hollingworth &
Mr. John W. Lutes, for Foothills Pipe Lines Ltd.;

Mr. Russell Anthony &
Pro. Alastair Lucas for Canadian Arctic Resources
Committee;

Mr. Glen W. Bell and
Mr. Gerry Sutton, for Northwest Territories
Indian Brotherhood, and
Metis Association of the
Northwest Territories;

Mr. John Bayly
or
Miss Leslie Lane for Inuit Tapirisat of Canada,
and The Committee for
Original Peoples Entitle-
ment;

Mr. Ron Veale and
Mr. Allen Lueck for The Council for the Yukon
Indians;

Mr. Carson H. Templeton, for Environment Protection
Board;

Mr. David Reesor for Northwest Territories
Association of Municipal-
ities;

Mr. Murray Sigler for Northwest Territories
Chamber of Commerce.

Mr. John Ballem, Q.C., for Producer Companys;

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Inuvik, N.W.T.,
January 20, 1976.

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

THE COMMISSIONER: Ladies and gentlemen, I'll call our hearing to order. I am Judge Berger and this is the Mackenzie Valley Pipeline Inquiry. I'm just going to say something to open the proceedings and then I'll call on Mr. Scott, Commission counsel; but I think I should begin by saying something about the reasons why we are here in Inuvik.

Two pipeline companies, Arctic Gas and Foothills Pipe Lines, are competing for the right to build a pipeline to bring natural gas from the Arctic to markets in the south. The Inquiry has been established to see what the impact will be if a gas pipeline is built along the Mackenzie Valley. But the gas pipeline is not to be considered in isolation. The Federal Government in the pipeline guidelines has made it plain that it envisages that an oil pipeline will follow a gas pipeline. In fact the gas producers in the delta, Gulf, Shell and Imperial, have announced that they want to build a pipeline to bring oil from the Mackenzie Delta along the Mackenzie Valley to Southern Canada.

So the task of this Inquiry is to see what the impact of a gas pipeline, followed by an oil pipeline, in the context of a Mackenzie Valley transportation corridor, will be.

Even though Arctic Gas and Foothills have applied only for a right-of-way for the

1 purpose of constructing a trunk pipeline, I regard it
2 as essential to this Inquiry that I should consider
3 evidence regarding the gas fields in the delta and the
4 gathering lines to be built in the delta.

5 Arctic Gas and Foothills say
6 they will only be common carriers, and that the gather-
7 ing lines will be built by the producers, and not by
8 them. But these lines are so obviously a part of the
9 pipeline system that any consideration of the impact
10 of a trunk pipeline entails a consideration of the
11 impact of the gathering lines.

12 I want to make it clear that
13 it is up to the Department of Indian & Northern Affairs
14 to consider proposals to build gathering lines and gas
15 plants, and to determine the extent to which drilling
16 for oil and gas ought to be allowed in the Mackenzie
17 Delta and the Beaufort Sea.

18 But all of this activity would
19 not be taking place if it were not for the proposed
20 pipeline; in fact, Mr. Blair, the president of Foothills,
21 has told us that if the pipeline is built, a principal
22 result in the north from an economic point of view
23 will be enhanced oil and gas exploration activity. All
24 of these things then must be examined if we are to under-
25 stand what the impact of the pipeline is going to be
26 here in the north.

27 We have been holding hearings
28 for ten months, since March 3, 1975. In that time we
29 have, at the formal hearings, completed Phase 1 of the
30 Inquiry, relating to engineering and construction; Phase
2, relating to the impact of a pipeline and the establish-

1 ment of a transportation corridor on the land, the water,
2 and the air; and Phase 3, relating to the impact on
3 mammals, birds and fish. We have also held community
4 hearings in 21 cities, towns, villages and settlements
5 in the Yukon and the Northwest Territories. We have
6 heard from more than 500 witnesses, in six different
7 languages.

8 We are here because we want
9 to know about the location and extent of the gas fields
10 in the delta, the likely extent of further oil and
11 gas exploration in the delta and the Beaufort Sea, the
12 likely location, design and construction of the gather-
13 ine lines, and the gas plants that will be needed to
14 render the gas acceptable to the trunk pipeline, and
15 the social, environmental and economic impact that the
16 development of the gas fields and the construction of
17 these lines will have in the delta and elsewhere in
18 the north.

19 I want to make it clear that it
20 is the National Energy Board's task to determine the
21 question relating to reserves of oil and gas in the delta
22 and the Beaufort Sea. But the Inquiry, if it is to do
23 its job, must examine the direction of exploration acti-
24 vity and development and the penumbra of environmental
25 issues that surround them.

26 We are here then for three
27 purposes:

28 1. To hear the evidence of the producers, Gulf, Shell
29 and Imperial, about their plans for the development of
30 gathering lines and gas plants in the delta and about

1 their plans for further drilling and exploration in the
2 delta and the Beaufort Sea.

3 2. To hear the evidence of the Committee for Original
4 Peoples' Entitlement (C.O.P.E.) on these questions and
5 in addition, to hear the evidence of C.O.P.E. proposes
6 to call regarding the impact of the pipeline and the
7 corridor on the native people who live in the delta
8 communities.

9 3. To hear the evidence of Arctic Gas about their
10 proposal to bring their supply leg from Prudhoe Bay
11 across the Mackenzie Delta.

12 This proposal is a matter of
13 great importance. It means that if the Arctic Gas
14 Pipeline should be built, that is the pipeline that
15 Arctic Gas proposes to build, the pipeline itself
16 would cross the mouth of the delta opening up the
17 delta to environmental impact. All of these issues
18 are of special concern to the people who live here in
19 the delta, so we decided to hold this phase of our
20 formal hearings in Inuvik. This will enable us to
21 hold community hearings here in the evenings to enable
22 the people who make their homes in Inuvik to tell the
23 Inquiry their views on the pipeline.

24 We will spend the first two
25 weeks in March holding community hearings at Tuktoyaktuk,
26 Sachs Harbour, Holman and Paulatuk.

27 We will return to Yellowknife
28 on March 15th to begin Phase 4 of the Inquiry.

29 Let me remind you, as I have
30 done before, that it is not for me to decide whether

1 a pipeline should be built. My job is to report on the
2 impact a gas pipeline would have followed by an oil
3 pipeline in the context of a Mackenzie Valley transpor-
4 tation corridor, and to recommend the terms and condi-
5 tions under which a pipeline should be built, if it is
6 to be built.

7 It will be for the National
8 Energy Board to consider the question whether Canada's
9 need for gas requires the building of a gas pipeline
10 to bring frontier gas to market.

11 It will be for the Government
12 of Canada, when they have my report before them, and
13 the National Energy Board's report, to weigh Canada's
14 need for frontier gas, and the impact of the construc-
15 tion of a pipeline on the north and on northern peoples,
16 and then to decide if a pipeline should be built, and
17 if it is to be built, then where it should be built and
18 who should build it. These are political decisions, to
19 be taken by those who have been elected to make such
20 decisions.

21 Mr. Scott?

22 MR. SCOTT: Mr. Commissioner,
23 as you have noted in your preliminary rulings, you
24 imposed upon us the primary obligation of leading
25 evidence from the producers, Gulf, Shell and Imperial,
26 about their plans for the development of gathering
27 lines and gas plants in the delta. In order to dis-
28 charge that obligation, we wrote to the producers and
29 subsequently met with them to determine how that infor-
30 mation should best be put before you. The producers,

1 namely Gulf, Imperial and Shell have retained Mr.
2 John Ballem, Q.C., who is present, and who I'm happy
3 to introduce to you, to lead their evidence on those
4 matters before the Inquiry. I am particularly grate-
5 ful to the producers for retaining Mr. Ballem, and to
6 Mr. Ballem for being as considerate and helpful as he
7 has been in getting this evidence together and assisting
8 in discharging what is in a sense Commission counsel's
9 function. I am therefore happy to record my gratitude
10 to him. That won't prevent us from taking a stringent
11 line from time to time, as and when it may be necessary
12 as he proceeds.

13 I should say that it is under-
14 stood by all of us who appear at the Inquiry that the
15 role of Gulf Oil Canada Limited, Imperial Oil Limited,
16 and Shell Canada Limited, at this stage is not as a
17 participant, but Mr. Ballem's role as their counsel is
18 simply to lead this evidence, as it were, in my place,
19 and to participate in this phase. It is also, I think,
20 generally understood that subject to your ruling, Mr.
21 Ballem on behalf of the producers, will have the right
22 in the ordinary way to cross-question witnesses who are
23 called in this phase of the Inquiry.

24 The order for questioning,
25 following the leading of evidence that I propose, is
26 as follows: Arctic Gas, Foothills, Canadian Arctic
27 Resources Committee, C.O.P.E., N.W.T. Brotherhood,
28 the producers, and lastly, Commission counsel.

29 I may say to any persons in the
30 room that that is the order of formal questioning, and

1 if there is anybody here who is -- who desires to ask
2 a question of any of the witnesses about any relevant
3 subject, I would be glad to meet with them during the
4 day or at one of the breaks or at lunch hour to make a
5 note of their question so it can, if it's relevant, be
6 put to the appropriate witness at the appropriate time.

7 Sir, I understand that Mr.
8 Ballem has some opening remarks that he would like to
9 make before he calls his evidence.

10 MR. BALLEM: Thank you, Mr.
11 Scott. I represent, as has been said, Gulf Oil
12 Canada Limited, Imperial Oil Limited, and Shell Canada
13 Limited. These, of course, are the companies that have
14 carried on the majority of the exploration work in the
15 delta -- the Mackenzie Delta -- to date.

16 As you have said, and as Mr.
17 Scott has said, Mr. Commissioner, these companies are
18 not participants or interveners in this Inquiry, and we
19 certainly are not here to make a case. We appear before
20 you, as has been said, and clearly understood, at the
21 request of Commission counsel.

22 In the course of your prelimin-
23 ary rulings you concluded that the Inquiry should consid-
24 er matters relating to the exploration, production,
25 gathering and processing facilities and activities in
26 the area. You further charged Commission counsel, as
27 Mr. Scott has just outlined, to bring forward such
28 evidence and my clients have agreed to assist the Commis-
29 sion on these points. While we are not parties to these
30 proceedings, I believe that our presence before you

1 and the evidence which we have filed indicates the
2 importance we attach to this Inquiry, and I can assure
3 you that we are anxious to do whatever is in our power
4 to assist your deliberations. To that end we filed
5 with this Commission in November of 1974 voluminous
6 reports which were environmental, socio-economic, and
7 engineering, that had been prepared over a 2-year or
8 longer period in support of an application for an
9 approval in principal from the Department of Indian and
10 Northern Affairs.

11 In compliance with the pro-
12 cedural rulings of this Inquiry, we mailed or distri-
13 buted on January 5th of this year 30 copies of the
14 prepared testimony to be advanced by the witnesses whom
15 we intend to call. We have also distributed 30 copies
16 of the information filed with the Department of Indian
17 & Northern Affairs in support of land tenure agreement
18 applications for the Taglu field, which is Imperial
19 Oil Limited, and a similar application by Gulf with
20 respect to the Parsons Lake development. I should say
21 at this moment that the application by Shell for its
22 development has just been mailed to the Department of
23 Indian Affairs and we have 30 copies here with us that
24 will be distributed at some convenient time this morning.

25 We have also filed with the
26 Commission copies of the responses jointly made by
27 the three companies to what might be called a deficiency
28 letter on certain socio-economic matters made by the
29 Northern Social Economic Cultural Assessment Group,
30 and those are available to participants and interveners.

1 It might now, sir, be useful
2 if at this stage I briefly outline how we intend to
3 present our evidence to the Commission. I propose to
4 call first Mr. Roland Horsfield, who will present a
5 general overview of production and exploration functions
6 and activities. Mr. Horsfield, is the corporate manager,
7 Arctic, for Imperial Oil Limited, and his initial evi-
8 dence is intended to describe in a very general way
9 the function of the producer-explorer. We realize that
10 by now you are probably familiar, if not overly familiar
11 with the way in which a pipeline company operates; but
12 we feel it is essential that there be a general under-
13 standing of the totally different activities and
14 functions of the producer and the explorer.

15 As I believe is clear from
16 the nature of Mr. Horsfield's evidence, it is designed
17 only to set the scene and is not, in our view, approp-
18 riate for cross-examination and we do not propose that
19 Mr. Horsfield will be cross-examined at this stage.

20 I should point out, however, that Mr. Horsfield will
21 be recalled to the stand at a later stage as the policy
22 witness for his company and will be, of course, avail-
23 able for cross-examination at that time, and I might
24 further add that if at that time anyone feels they
25 would like to examine his preliminary statement, I am
26 sure he will be happy to respond.

27 Since this portion of the
28 Inquiry is dealing specifically with the delta, and
29 with, in this section at least, operations that are
30 fundamentally different from the construction and

1 operation of a pipeline, we feel it would be helpful
2 to have in an overview sense expert evidence on both
3 the physical environment and the socio-economic environ-
4 ment. Accordingly, we have arranged to present Dr.
5 Lawrence C. Bliss, and Charles W. Hobart. We intend
6 to call Dr. Bliss immediately after Mr. Horsfield, and
7 Dr. Bliss will deal with the ecology of the Mackenzie
8 Delta region and will be followed by Dr. Hobart, who
9 will present the social-economic overview.

10 Both these gentlemen have
11 indicated their willingness to respond to questions
12 and I might add at this time that the only role which
13 the three producer companies have played with respect
14 to this particular evidence is to simply make the wit-
15 nesses available and to file and distribute their
16 prepared evidence.

17 Following this general overview,
18 we then propose to move on to site specific evidence
19 with respect to each of the three proposed projects
20 and activities. We propose in each instance to present
21 a panel of witnesses from each of the three companies
22 who will give design and technical evidence with res-
23 pect to each project. These panels will consist of
24 technical people and engineers, and it is to them that
25 questions as to design, capacity, reserves, drilling
26 techniques, etc., should be directed. For the assist-
27 ance of those who might be cross-examining, I would
28 indicate at the present time it is my intention to call
29 these panels: First Imperial, followed by Shell and
30 then Gulf.

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R. Horsfield
In Chief

1 DIRECT EXAMINATION BY MR. BALLEM:

2 Q Mr. Horsfield, would you
3 give the Commission your business address and present
4 position?

5 A My business address is
6 Imperial Oil Limited, 500 - 6th Avenue S.W., Calgary,
7 Alberta, and I am the corporate manager for the Arctic
8 Region for Imperial Oil.

9 Q Could you briefly outline
10 for the Commission your academic and professional quali-
11 fications and your business career?

12 A I graduated from the
13 University of Toronto in 1949 with a Bachelor of
14 Science degree in engineering. I joined Imperial Oil
15 Limited upon graduation and was a reservoir engineer
16 in Calgary and also on loan to Esso Production Research
17 Company in Tulsa, Oklahoma. This culminated in an
18 appointment as division reservoir engineer in Edmonton
19 in 1955. I was appointed technical advisor to Standard
20 Oil of New Jersey, now Exxon Corporation, in 1967 and
21 in 1969 returned to Imperial as production manager
22 based in Edmonton.

23 I moved to Calgary in 1972
24 as operations manager for Frontiers, responsible for
25 drilling activities in the Arctic areas.

26 From 1973 to the present time
27 I have been corporate manager, Arctic Region, responsible
28 for overall corporate activities of Imperial Oil in the
29 Arctic region.

30 MR. BALLEM:
Mr. Commissioner, would it be

R. Horsfield
In Chief

1 convenient if I filed a copy of Mr. Horsfield's
2 evidence?

3 THE COMMISSIONER: Yes, please.

4 MR. BALLEM: And also, sir,
5 I have prepared a collection or selection of the slides
6 that Mr. Horsfield will use, and I would file those as
7 well.

8 (QUALIFICATIONS OF R. HORSFIELD MARKED EXHIBIT 413)

9 (SLIDES USED BY R. HORSFIELD MARKED EXHIBIT 414)

10 MR. BALLEM: Mr. Horsfield,
11 would you please proceed?

12 A Mr. Commissioner, in
13 the interest of establishing a basis for discussion of
14 producer operations, we felt that it might be desirable
15 to summarize how companies like ours go about finding
16 and producing oil and gas. With your permission, I
17 will describe the exploration, development and production
18 processes of our industry, using slides for illustration.
19 My comments will be generally applicable; specific refer-
20 ences to the Arctic will be noted as such.

21 I will then review the history
22 of producer activities in the Mackenzie Valley area of
23 the Territories.

24 First the exploration process.
25 Crude oil and natural gas are natural forms of hydro-
26 carbons found in the earth. They are called hydrocarbons
27 because they consist of molecules of hydrogen and carbon
28 atoms. They are found only in sedimentary basins; those
29 very old ocean basins which have gradually filled with
30 sediments during millions of years. Plant and animal

R. Horsfield
In Chief

1 remains buried in the sediment turn into hydrocarbons
2 under increased heat and pressure.

3 Therefore the first step in
4 the exploration process to discover these hydrocarbons
5 is simply to locate the sedimentary basins. The sedi-
6 mentary areas of Canada are shown in brown on this map.

7 When formed, the hydrocarbons
8 occupy the pores of the rock just as water is held in
9 a sponge. They may be squeezed out by the weight of
10 continuing sedimentation, or they may just flow away
11 through interconnected pore spaces. To be of interest
12 to the oil industry they must have somehow accumulated in
13 places where they have been trapped. These traps are
14 usually porous sand or limestones that are sealed by
15 layers of clay or shale which prevent the fluids from
16 moving any further. These traps are called reservoirs.

17 Therefore, the second step in the
18 exploration process is to try to find out if there might
19 be suitable reservoirs in these basins. This is done
20 by inspecting nearby mountains and river banks where
21 the rock layers are exposed to view. It involves a
22 few geologists who roam the sedimentary area collecting
23 samples of rock and recording technical information
24 which will help them to infer the kinds of rocks that
25 might exist within the buried part of the basin. Some
26 measurements of the gravitational and magnetic forces
27 of the earth are made to help estimate the thickness
28 of the sediments.

29 Preliminary estimates of
30 how much oil and gas might be found in a basin are

R. Horsfield
In Chief

1 based on this minimal information, in comparison
2 with other basins around the world. It might be of
3 interest to you to know that the sedimentary rocks of the
4 world can be divided into about 500 basins. Of these,
5 three contain over half the world's hydrocarbon resour-
6 ces. Perhaps less than 100 of the basins contain a
7 significant amount of hydrocarbon, and several hundred
8 contain no hydrocarbons or negligible amounts. Hence
9 the existence of a basin is no assurance of hydrocarbon
10 reserves; conversely, the discovery of oil or gas in
11 a basin can be very significant.

12 The next step in the explora-
13 tion process is to obtain an exploration permit which
14 involves a financial commitment such as an annual ren-
15 tal fee or work obligation. Seismic surveys will likely
16 be started as soon as possible, unless a specific
17 drilling location is otherwise apparent.

18 Seismic is used to locate
19 underground reservoir traps. It works like sonar and
20 radar. Vibrations created by charges placed near the
21 surface are reflected off underground layers of rock
22 and recorded by very sensitive detectors laid out on
23 the surface. This gives us some indication of the
24 structure of the earth below.

25 A typical seismic picture is
26 shown on this slide. It extends over seven miles across
27 the top and several thousand feet down below the
28 surface. Although a layman can see the suggestion of
29 rock layers in the picture, only expert geophysicists
30 can sort out the many complex factors involved in the

R. Horsfield
In Chief

1 interpretation.

2 Several seismic surveys may
3 be run over the same area for various reasons. A re-
4 connaissance survey is usually run first, with the
5 seismic lines spread several miles apart to get a
6 broad picture of the basin. Then detailed surveys using
7 lines closer together and at different angles are run
8 over areas of main interest. These might be repeated
9 using different procedures and equipment if the initial
10 results are not sufficiently clear. This can take a
11 period of several years, especially when there are
12 seasonal constraints on seismic operations, as in the
13 Arctic. The only way to prove whether or not the
14 reservoir traps contain oil or gas is by drilling. A
15 drill rig has two main parts: a mechanical system to
16 raise, lower and turn steel pipe in the drill hole,
17 and a circulation system to pump fluids in and out of
18 the hole. The rock is cut away by a drilling bit
19 attached to the end of a hollow drill pipe through which
20 fluid, called mud, is pumped. The cuttings which are
21 carried to the surface by the mud reveal the kind of
22 rock being drilled. At appropriate times, special
23 tools are lowered into the hole on cables to measure
24 the electrical and other characteristics of the rocks
25 that have been penetrated. The resultant strip charts
26 are called well logs. This information is added to the
27 previous information to refine the geological picture
28 of the basin and decide where to drill next. Thus
29 the ongoing exploration program is an evolutionary
30 process; each step is contingent upon the last one.

R. Horsfield
In Chief

1 This is particularly important in the frontier areas
2 like the Arctic where each well costs millions of doll-
3 ars.

4 A typical exploration well in
5 the Arctic might be drilled as follows: These next
6 few slides are schematic and are not to scale. Using
7 a large diameter auger drill, a 42-inch hole is dry-
8 drilled to a depth of about 60 feet. A 36-inch diameter
9 double-walled steel pipe, called conductor pipe, is
10 lowered into the hole and cemented in place. This
11 conductor pipe is refrigerated during the ensuing
12 drilling operation to ensure that the permafrost does
13 not melt under the drilling rig.

14 A smaller 26-inch diameter
15 hole is then drilled through the conductor pipe to a
16 depth of about 500 feet using cold drilling fluid to
17 minimize thawing of the permafrost around the new hole.
18 A 20-inch diameter steel pipe, called a permafrost
19 string, is cemented in the hole all the way to the
20 surface. A large valve called a blowout preventer is
21 installed on the top to control any flow of fluid from
22 below.

23 A smaller 17½-inch hole is
24 then drilled through the permafrost to a competent
25 formation, and a 13- 3/8-inch inch diameter steel pipe
26 called surface casing is cemented to the surface.
27 Another blowout preventer consisting of a series of
28 large valves is then installed on the top. After
29 drilling out the cement in the bottom of this hole and
30 opening up a few feet of new hole, pressure is exerted

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1 on the mud in the hole to determine the condition of
2 the well this far. This is called a formation integrity
3 test, or FIT for short, which measures the pressure
4 that the rock below the surface casing can hold.
5 This in turn determines how far the well can be
6 drilled before another string of casing must be commit-
7 ted.

8 A smaller 12¼ inch diameter
9 hole is then drilled until the limiting pressure on the
10 surface casing seat is approached or some other event,
11 such as penetration of a potential reservoir, is encoun-
12 tered, say at 5,000 feet. Then a 9 5/8-inch pipe is
13 run and cemented well up into the surface casing.
14 Another FIT test is conducted on the new casing seat,
15 and drilling is resumed.

16 This procedure is then repeated
17 once or twice more using successively smaller holes and
18 pipe diameters until final total depth is reached.

19 As illustrated, this results
20 in a telescoped-looking hole containing multiple casing
21 strings with the last section of the hole having a small
22 diameter. This is why an exploratory hole is not often
23 useful for subsequent production purposes. Most
24 primary exploration wells drilled in the Mackenzie Basin
25 have been abandoned by plugging the hole with cement
26 whether discoveries of oil and gas were made or not.

27 Followup wells drilled around
28 a discovery to delineate the extent of the field may
29 be drilled with fewer casing strings because the con-
30 ditions to be encountered while drilling the holes are

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1 better known. Some of these delineation wells may
2 eventually be useful for production purposes.

3 Now the development process.
4 Development of an oil or gas field consists of drilling
5 wells and building the appropriate surface facilities
6 to prepare the fluids for shipment.

7 The development wells are
8 designed mainly for production purposes although some
9 may be used for observation purposes or for disposal
10 of fluids like mud or water. Because the drilling
11 conditions are known from prior discovery and delineation
12 wells, the wells can be drilled and completed quickly
13 and efficiently with a minimum number of constricting
14 casing strings. For example, the shallow permafrost
15 string will not be needed and the surface pipe might
16 be set well down into a relatively deep competent
17 casing seat. The next string of casing might be
18 set into or completely through the reservoir, in which
19 case it is called "production casing." While not shown
20 here, another string of tubing suspended from the well-
21 head is then used to pipe the hydrocarbons to the
22 surface. The diameters of these pipes are designed in
23 accordance with the expected production rates.

24 The number of development
25 wells needed for each field is dependent upon the
26 producibility of the individual wells and their ability
27 to drain the reservoir efficiently. There is no single
28 well spacing which would suit every field. The pattern
29 of well spacing used in the southern basin in Western
30 Canada was dictated more by diverse land ownership than

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1 by efficient production practices. This situation
2 will not likely occur in the Frontiers. It is more
3 likely that a minimum number of production wells will
4 be drilled initially and that more will be drilled as
5 production rates decline with reservoir depletion.

6 In some instances, particularly
7 in fields with relatively deep reservoirs, the wells
8 can be located in clusters on the surface and diverted
9 below surface to wider locations in the reservoir.
10 As a rough rule of thumb, wells drilled beyond 5,000
11 feet can be angled one foot horizontally for every
12 foot of total vertical depth.

13 Since the earth's temperature
14 increases with depth, the produced fluids arrive at
15 the surface relatively warm. This requires careful de-
16 sign for wells produced through permafrost to account
17 for any thawing and freezèback that might occur.

18 After reaching the surface,
19 the produced fluids have to be transported from the
20 wellheads to one or more collection points. This is
21 done through pipelines, called flow lines, which are
22 sized to handle the flow rates of the wells. In the
23 Arctic, the flow lines must be elevated on berms or
24 piles to protect the permafrost from warmth of the
25 fluids.

26 The collection points are
27 usually located within or near the production area to
28 minimize the lengths of the flow lines and thus
29 alleviate the difficulties associated with the
30 transportation of raw production fluids. This is

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1 particularly important in the case of natural gas.

2 One or more of three major
3 problems must be taken into account in the design of
4 a gas production system -- flow line size, slug flow and
5 hydrates.

6 Very large flow lines may be
7 needed to transport natural gas simply because of its
8 gaseous form. Gas expands considerably as its pressure
9 is reduced. Consequently, the lower the well-head
10 pressure, the larger the diameter needed to accommodate
11 the gas production. This is an important consideration
12 in the design of production systems for shallow gas
13 reservoirs which have low initial pressures and for
14 the later stages of depletion of deep reservoirs when
15 the pressure has declined. The alternative to massive
16 flow line systems is installation of compression
17 facilities as close to the well-heads as possible.

18 Whenever some liquid is
19 associated with gas, a phenomenon known as "slug-flow" can
20 occur. The liquid does not flow as fast as the gas and
21 tends to accumulate in the pipeline, especially at low
22 points. Eventually it plugs off the gas flow and
23 starts to build up back pressure which then pushes the
24 liquid slug down the pipe at high velocity. It creates
25 surging problems in high pressure gas transmission
26 systems. The best solution is to have the gas/liquid
27 separation facilities located close to the well-head
28 and to minimize dips in the flow lines.

29 Hydrate formation is another
30 phenomenon peculiar to natural gas production. Hydrates

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are formed by hydrocarbons and water which together freeze into a solid that resembles ice, at temperatures and pressures above the freezing point of water alone. Short flow lines, insulation, heat, methanol injection, or combinations thereof, are necessary to overcome hydrate problems.

At the collection point, the flow lines converge into a system of pipes and valves called a manifold. Testing facilities to measure the flow rates of individual wells are located here. Some separation facilities to separate oil, gas, and water may also be located here if the gas plant or oil terminal is very far away.

The purpose of a gas plant is to prepare the natural gas for injection into a major pipeline; in other words, to refine and prepare the natural gas stream to meet pipeline standards. This usually involves drying the gas by removing water vapor and liquid hydrocarbons, removal of contaminants like carbon dioxide and hydrogen sulphide, if any, and then compression to pipeline pressure requirements. Each plant must be designed to suit the specific gas stream and location.

This is a picture of our gas plant at Port Creek just west of Calgary, and this field has a relatively high H₂S content. The sulphur is removed and you can see the sulphur storage area just beyond the trees on the right.

This is a picture of the Gedic Creek Gas Plant, part of this gas plant. This

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gas is associated with oil production and is very low-pressure gas and requires a much larger and more complex plant than is normally required for gas reservoirs. This shows an oil terminal of ours in Calgary which is adjacent to the Wildlife Sanctuary.

Now for the production process. The productivity of an oil or gas field will tend to decline as the hydrocarbons are produced unless more wells are drilled. In general, it will decline roughly in proportion to the stage of depletion of the reservoir; that is, the productivity would be highest when the field started production, would decline to about half when the field is 50% depleted, and would be exhausted when the field is depleted.

It would be impractical to produce a field this way because it would be uneconomic to build production facilities to handle the initial peak. It is customary to level out the production rate by underutilizing the full productivity of the initial wells and then adding wells to maintain productivity until the natural decline is allowed to resume.

In any event, it is apparent that the sequence of events in the field is as follows. After development, efforts are made to optimize operations. Producing wells and surface facilities are monitored and adjusted to achieve efficient performance. Usually after several years, a time is reached when more wells may be drilled to sustain production rates. Finally, the operation of that particular oil or gas field is allowed to wind down. This last period might

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1 be as long or longer than the preceding periods of
2 level production. Consequently, even though the
3 early production level of the field might seem high,
4 say 5% depletion per year, indicating a 20-year life
5 for the field at constant production rate, the actual
6 life of the operation will be much longer. For example,
7 some of the fields in Alberta are still producing, or
8 most of the fields in Alberta are still producing,
9 including Turner Valley, which was discovered in
10 1913. The Norman Wells oil field was discovered in
11 1920, and will probably last beyond the turn of the
12 century.

13 I have described the explora-
14 tion, development and production processes in a sequen-
15 tial fashion and may have left the impression that
16 these activities occur in distinct stages in the field.
17 In actual fact, all of these processes are going on at
18 the same time because there are several producers
19 involved who are at different stages of operation, and
20 because there can be many oil and gas fields discovered
21 successively.

22 I will now review the history
23 of industry activities in the Mackenzie Valley area.

24 The Mackenzie Valley has been
25 known to contain oil since the days of Sir Alexander
26 Mackenzie, who explored the area in 1789 and reported
27 seepages on the river bank. The seepages were also
28 noted a century later in 1888 by R.G. McConnell of
29 the Geological Survey of Canada. It was not until
30 1914, however, that a geologist, T.O. Bosworth, staked

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1 three claims near these seepages. Imperial Oil acquir-
2 ed these claims in 1919 and dispatched drilling equip-
3 ment and crews to the site 50 miles downstream from
4 Fort Norman. The first exploratory well struck oil
5 at a depth of 900 feet in 1920. This was the discovery
6 of the Norman Wells oil field.

7 Followup drilling resulted in
8 two oil wells and a dry hole. A small refinery was
9 installed in 1921 to refine the crude oil into fuel
10 oil but the local market was too small to support the
11 operation. It was closed down until 1932 when it began
12 operating on a seasonal basis to fuel the mines that
13 were developing around Great Bear Lake and Great Slave
14 Lake. Canada's first products pipeline was built
15 around the Bear River Rapids by Imperial in 1939, and it
16 continued to operate until just a few years ago.

17 In 1942, when the Japanese
18 troops occupied the Aleutian Islands and posed a threat
19 to the North American continent, the Canol project was
20 approved as a joint Canadian-U.S. project to supply
21 Alaska with fuel from Norman Wells crude. For this
22 project, Imperial crews drilled more than 80 wells in
23 the Norman Wells area during the next few years. A quar-
24 ter of them were dry and abandoned. Meanwhile, a crude
25 oil pipeline was built from Norman Wells to Whitehorse.
26 After the war, the Whitehorse refinery and the Canol
27 crude line were dismantled, and Norman Wells settled
28 back to supplying the local fuel market.

29 The discovery of the Leduc
30 oil field in 1947 drew the attention of the oil industry

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to Central Alberta. For the next ten years, exploration drilling in the Territories was pretty well confined to the area south of Fort Simpson, without notable success.

Then, Western Minerals Limited moved into the Eagle Plains area of the Yukon to the west and a little north of Norman Wells. Their first well, which incidentally was the first well drilled in the Canadian Arctic, was started in April of 1957. It was dry; but a second well drilled during 1959-60 encountered an oil show. Unfortunately, the basin has not lived up to its early promise. After 67 holes have been drilled, nothing of significance has been discovered in the area between the Mackenzie River and the Alaskan border. Drilling has virtually stopped there.

In 1957 the Federal Government began a program to encourage and promote northern development. The acreage held under exploration permits in the Territories increased rapidly until 1960 when almost all of the on-shore acreage up to the Arctic coast was held.

Seismic surveys started north of Fort Good Hope in 1959, and 11 dry holes were drilled in the Anderson Plains in 1960. Only a few of the 40 holes drilled to date on the Anderson Plains have encountered oil or gas shows.

In 1960 Richfield Oil Corporation drilled at Point Separation at the south end of the Mackenzie Delta. In 1962, Texaco Canada drilled two shallow holes at Nicholson Point on the Arctic Coast on

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the fringe of the Mackenzie Basin. It was not until 1965 that the first hole was drilled in the Mackenzie Delta proper by Gulf, Imperial and Shell jointly. This was Reindeer D-27. All were dry and drilling ceased for a time in the coastal area.

The announcement of the Prudhoe Bay discovery in Alaska in 1968 rekindled interest in the Mackenzie Delta -- Mackenzie Basin. Seismic activity increased and five exploratory holes were drilled north of Inuvik in 1969. Then in January 1970, Imperial discovered oil at Atkinson Point (Atkinson H-25) on the Tuk Peninsula. The pace of exploration by industry increased to a 12-rig level in 1973 and has remained about that level ever since. A total of 114 holes have now been drilled in the Mackenzie Basin, including about 20 delineation holes around discoveries.

Several discoveries have been announced, including four oil, nine gas, and four with both oil and gas. Not all of these will necessarily prove to be commercial. Oil discoveries were made at Atkinson H-25, Ivik J-26, Mayogiak P-17, Kugpik O-13; gas was announced at Russell H-23, Taglu G-33, Mallik L-38, Niglintgak H-30, Ya Ya A-28, Ya Ya P-53, Titalik K-26, Parsons F-09, Parsons South, A-44. Both oil and gas have been announced at Adgo F-28, Garry P-04, Kumak K-16, Niglintgak M-19.

Only three areas, Taglu, Parsons and Niglintgak, have been proposed for development.

THE COMMISSIONER:

Perhaps those three could be pointed out.

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A Taglu, Parsons, Niglintag-
ak.

The proved and probable reserves of gas discovered to date in the Mackenzie Basin have been estimated by petroleum consultants, Sproule & Associates, at 4.7 trillion cubic feet; and the possible reserves have been estimated by them to be 6.5 trillion cubic feet. The ultimate gas potential of the basin has been estimated to be more than 40 trillion cubic feet.

No estimates of total proven oil reserves of the Mackenzie Basin have been given, mainly because the discoveries have not been delineated. The ultimate oil potential has been estimated by McCrossan & Porter for the Canadian Society of Petroleum Geologists to be 8 billion barrels.

Now, what about the future?

It now appears that most of the remaining potential of the Mackenzie Basin lies under the Beaufort Sea. The on-shore portion of the exploration play has matured with most of the seismic work having been done, and most of the significant drilling prospects having been drilled. While some on-shore exploration activity will continue for a number of years, it is likely that the major exploration effort will shift towards offshore. Imperial and Sun Oil have already drilled a total of ten wells from artificial islands in the sea. Imperial plans to construct three more islands this year, and Canmar has announced plans to drill two holes in deeper water, using floating drillships. Considering

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the very high unit costs of drilling in the Beaufort Sea, it is unlikely that more than five exploratory holes will be drilled offshore during each of the next few years. We cannot be more specific about exploration plans in the Mackenzie Basin. As previously stated, exploration is an evolutionary process with each step being contingent upon the preceding one. Results cannot be scheduled.

Sir, I would like to elaborate on a few points, if I may. First on the subject of reserves. Could I have the lights, please?

I'd like to elaborate on the subject of reserves because there is often confusion over the use of this term. There is no such thing as a single reserve estimate for a field or basin until all of the oil or gas is finally produced. Until then reserves are estimated from limited data. For example, data from wells which are widely spaced in reservoirs which are not homogeneous. Judgment is involved and thus a certain degree of variations should be expected even between estimators working with the same data. Reserve estimates are usually categorized under terms such as proven, probable, and possible. Proven is a category which indicates the highest confidence level. Probable is slightly more interpretive, and possible is more speculative.

These estimates relate only to discoveries and cover a range of probabilities that the reserves are actually there. My company, Imperial Oil, prefers to use different terms to express

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this range. Minimum is the term we use as an estimate which has 90% certainty. Likely is the estimate with 50% chance of the reserve being higher or lower; and maximum is the term used to estimate the reserves with 10% certainty. All estimates are meaningful to those who understand the terminology and should never be taken out of context.

The greatest confusion relates to the term "undiscovered potential". These must be considered separately from discovered reserves because reserves as such are not known to exist until they have been discovered. Assessments of undiscovered potential are highly interpretive and subject to considerable change up or down as more data becomes available. These numbers usually get the headlines but are least important.

I'd like to also comment on our exploration plans. I realize that the projections I have just given may seem rather sketchy. This is not due to any reticence on our part to discuss our plans. It is simply due to the fact that exploration activity is an evolutionary process. The information obtained from each well is fed back into the geological and geophysical analysis and then plans are made for the next well to test geological hypotheses and to gain more information. As a result of this, the next round of wells can be stated with a fair degree of certainty. The following round, however, is less certain and the round after that is very uncertain so we cannot be very specific about a long-term exploration

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1 program.

2 About the best I can say about
3 the longer term is that we predict over the next few
4 years that our level of activity will be about the same
5 in total, but we do not know where the wells will be
6 drilled. That is, of course, all other things being
7 equal.

8 Thirdly, I'd like to make a
9 comment about the illustrations I have used and about
10 illustrations that are used in meetings such as this.
11 There is a tendency to distort information when using
12 slides and page-size maps, simply because it's necessary
13 to make the symbols visible. The large map behind me
14 on the wall has been put there to contain the indica-
15 tions of wells and facilities, both wells that have
16 been drilled and the facilities that we propose to
17 build, plotted in true scale. For example, the well
18 locations that contain the rig and associated facilities
19 are only slightly larger than pencil dots on that map.
20 Some models of proposed development facilities are
21 on display at the rear of the room. These are typical
22 facilities but are not exact representations of what
23 we propose to do. They are there only for illustration
24 purposes. Thank you.

25 THE COMMISSIONER: Thank you,
26 Mr. Horsfield. Just before you step down, you were good
27 enough to say that Imperial classifies reserves accord-
28 ing to these expressions, "minimum, likely and maximum".
29 In your prepared testimony at page 15 you gave that
30 proved and probable reserves of gas discovered to date

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1 in the Mackenzie Basin by Sproule & Associates at 4.7
2 trillion cubic feet with possible reserves at 6.5 tril-
3 lion cubic feet, and the ultimate gas potential at
4 40 trillion cubic feet. Can you convert those figures
5 to Imperial's own --

6 A Without an exact correlation
7 the proved and -- the proved reserves can be related
8 more closely to Imperial's minimum. The proved and
9 probable can be related to Imperial's likely reserves.
10 The undiscovered potential is the same term in both
11 cases.

12 Q As the ultimate gas
13 potential?

14 A Right.

15 Q Just one other thing.
16 The discoveries of oil and gas so far have been on
17 Richards Island in the vicinity of Parsons Lake and
18 on the Tuktoyaktuk Peninsula. Those are the three
19 areas essentially in geographic terms, aren't they?

20 A Yes.

21 THE COMMISSIONER: Well, thank
22 you very much, sir.

23 MR. BALLEM: Thank you, Mr.
24 Commissioner.

25 (WITNESS ASIDE)

26 MR. BALLEM: I would now propose
27 to call Dr. Lawrence C. Bliss, if I might.

28 THE COMMISSIONER: Mr. Ballem,
29 I think we'll break a few minutes for coffee and then
30 hear Dr. Bliss after that.

(PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

1 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

2 THE COMMISSIONER: We'll come
3 to order.

4 MR. SCOTT: Mr. Commissioner,
5 before Dr. Bliss begins I think we should wait for Mr.
6 Ballem. I thought perhaps he had returned to Calgary.

7 Before Dr. Bliss begins, Mr.
8 Ballem in opening referred to a document called "Res-
9 ponse to information request for socio-economic supp-
10 lementary concerns " prepared by the three producer
11 companies' which he has made available though it is not
12 technically part of the back-up material that he has pro-
13 vided in support of this evidence. I would ask that that
14 report should be made an exhibit and give it an exhibit
15 number by Miss Hutchinson. That's Item 1.

16 Item 2, at an early stage of the
17 Inquiry, you sir commented on the fact that there didn't
18 appear to be any maps for the delta which showed the loc-
19 ation of seismic lines. Ever quick to respond, the
20 Dept. of Indian Affairs and Northern Development in
21 Yellowknife, asked their land use staff to prepare such
22 maps for the delta. They have done that and the four
23 maps shown at the back wall, show seismic lines in the
24 delta for the period from 1971 to 1975 inclusive. In
25 short, they don't show lines that were made earlier than
26 1971. The Inquiry staff have a few additional copies
27 of those maps and if we run out other participants who
28 want them can perhaps obtain them from Mr. Longlitz's
29 office in Yellowknife. I would like to ask that those
30 maps should be made an exhibit and given the next

exhibit number.

THE COMMISSIONER: That's fine
Mr. Scott.

MR. SCOTT: That's all I have
sir.

(REPORT ON MACKENZIE DELTA GAS DEVELOPMENT SYSTEM
RESPONSE TO INFORMATION REQUESTED FOR SOCIO-ECONOMIC
SUPPLEMENTARY CONCERNS, JULY 20, 1975 MARKED EXHIBIT
415)

(MAPS OF SEISMIC LINES 1971-1975, MACKENZIE DELTA
MARKED EXHIBIT 416)

MR. BALLEM: Mr. Commissioner,
I believe that Dr. Bliss has appeared before this Commi-
ssion on several previous occasions, and unless you desire
sir, I don't intend to either have him re-sworn or to have
him requalified unless you feel that would be useful sir.

THE COMMISSIONER: Well, I think
we all know Dr. Bliss's imminence in the field of plant
ecology. I hope that's a fair summary of your field of
expertise sir.

DR. BLISS: It is sir

MR. SCOTT: I think Mr. Commis-
sioner it is fair to point out that Dr. Bliss has been
retained and I presume paid by more participants in this
Inquiry than any other single witness, including Commis-
sion counsel. MR. BALLEM: That must speak volumes for his impartial-
ity I would think. I would propose Mr. Commissioner, to
file a copy of his synopsis of his evidence as an exhibit
sir and Dr. Bliss will also be using slides. We have not
had time to get duplicates made of all of them, but we

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1 will be filing copies of them, in due course.

THE COMMISSIONER: Thank you.

(EVIDENCE OF DR. BLISS MARKED EXHIBIT 417)

4 LAWRENCE C. BLISS, resumed:

5 THE WITNESS: Mr. Commissioner,
6 since petroleum exploration intensified in the Mackenzie
7 Delta Region ten years ago there has been an accelerated
8 pace of environmental and ecological research. A greater
9 amount of research and fortunately a more integrated nat-
10 ure to this research. This is a result of intensive work
11 sponsored by the Federal Government in terms of the en-
12 vironmental social program, Northern Pipeline, the Arc-
13 tic Land Use research programme under Indian Affairs
14 Northern Development. The consortium has sponsored, and
15 the individual companies' have sponsored environmental
16 consulting groups to do research in the area. The Envir-
17 onment Protection Board, as you know did a portion of re-
18 search as well as their overview, and in turn, the Fed-
19 eral Government and Industry have co-operated both fin-
20 ancially and on a research basis with the Beaufort Sea
21 programme.

22 Finally, there have been independent studies done
23 by University people, but usually again, funded directly
24 or indirectly by Federal or industry money.

25 The objective, sir, of my presentation this morning,
26 is to give an overview on the ecology of the area. It
27 is not to speak specifically to the gathering field, the
28 transmission line, anything of this kind, but to try to
29 inform you a bit with regard to the overall ecology of
30 this region.

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As we all know, the Mackenzie River system is the second largest river system in North America, and the largest one that flows into the Arctic. As a product of its magnitude and the warm waters that it brings north, it provides an environmental setting that is quite different and unique from any of the other river systems, which by and large, in the north, originate in the Arctic, flow through the Arctic and into some component of the Arctic Ocean. As a result of this, as I think we'll see in a few minutes, there is a greater diversity to both plant and animal life in this immediate area, a greater level of productivity, the product of all of this being that there were more native communities established in this region living off of the land and this in turn then speaks for the importance of this.

Specifically, in terms of this presentation its going to be broken down into the Old Delta portion, the pleistocene portion which is to the east of the present delta, the current delta system and then the off-shore estuarine area, and if we can then please have the lights out for this brief introduction I would like to talk to you and the others specifically then from a series of slides.

This first one is included again to emphasize this point that with a huge river system carrying warm waters north forested^{areas} and associated animal groupings appear further north than they do to the east where tundra extends further inland and on to the west where there is a combination of mountain tundra and coastal tundra; so that as a result of this there is a

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greater diversity biologically here because of this telescoping, compacting in many ways of both forest environment and tundra environment within the delta region proper. This is vividly shown then in terms of not only the massive water but also the silt load that is carried into the adjacent Beaufort Sea area from an earth satellite view which shows very clearly this pattern of mixing with water. It also shows reasonably clearly that some of these lakes are deep, dark blue without any silt addition, and yet even on Richards Island there are some lakes where there are connections back to the channels so that there is some input. This also has its impact biologically then insofar as what goes on in this lake.

This slide illustrates in general this pattern that I started with, that there is the old delta portion which appears in brown, Pleistocene in age, the Caribou Hills which are older, of Tertiary age, roughly 30 to 50 million years, the modern new delta system showing in the yellow pattern braiding off then, more abruptly than this slide shows, into the Richardson Mountains. Technically there are portions of the East Channel which are also modern delta. The map in detail did not permit the showing of this, and the offshore islands here which are largely a portion of the old delta. In turn we see then insofar as the island matrix up here that Richards Island is older geologically and quite different vegetationally and biologically to some extent than are the lower islands to the west.

THE COMMISSIONER: Dr. Bliss,
you were present at Yellowknife last week and were one

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1 of the members of the Environment Protection Board
2 to give evidence, and you recollect Dr. McTaggart-Cowan's
3 suggestion regarding the tendency of discoveries in
4 the delta and the Beaufort Sea. I remind you of
5 that because you may have given it some thought in the
6 meantime. The evidence of Mr. Horsfield indicated
7 that the discoveries so far are in the old delta and
8 not the new delta.

9 A Well, they're in combina-
10 tion, you see. The Ya Ya reserve, although it is
11 small, is in this location. The Taglu approximately
12 in here; but there are discoveries in this location
13 and in Parsons Lake right in here. So it is a combina-
14 tion and not restricted to the old. Is that adequate
15 for now?

16 Q For now, yes.

17 A In this landscape,
18 Pleistocene ice moved pretty well throughout the delta
19 area with the exception of the north end of the Tuktoyak-
20 tuk Peninsula, up to the base of the Richardson Mountains
21 in the west. As you know, the area is underlain by
22 permafrost with the exception of some of the deeper
23 lakes and some of the river channels where there is
24 either a total window without permafrost, or at least
25 a great dip in the depth of the active layer without
26 permafrost. This is a view along the coast, the result
27 of wave action in the Tuktoyaktuk area showing massive
28 ice and the melt-out takes place. The next slide
29 illustrates the same sort of thing along the coast
30 on the west side of the delta with big massive blocks

1 coming off. As you will see later on in some other
2 slides, some of these aspects will be illustrated
3 again for the land component in them. The purpose
4 for this is merely to demonstrate again that we're
5 dealing with active landscapes, they're constantly
6 being modified in terms of drainage patterns because
7 of the phenomenon of permafrost and its differential
8 melt in some of those areas of ice-rich soils.

Climatically, as I indicated very briefly a few minutes ago, we really are talking about two areas here. The Aklavik-Inuvik area, which are at the very northern fringe of the sub-Arctic climatic zone, and the Tuktoyaktuk area, which represents the very southern fringe of the Arctic climatic zone. On an annual temperature basis you can see that there is actually a gradient here with a greater amount of continentality, interestingly enough, at Aklavik and Inuvik. It is a bit colder there than it is -- I'm sorry, the reverse is true on an annual basis of its being a little bit colder at the Tuktoyaktuk location than at interior Aklavik and Inuvik, but in terms of the summer regime, July and August, especially in July, are significantly warmer, being at the northern edge of the forest zone within the sub-Arctic than is true of Tuk.

In turn precipitation is greater at Aklavik and Inuvik within the northern component of the sub-Arctic than when one reaches the Arctic coast. Even though along the coast there is a greater amount of fog and frequently drizzle, this total amount

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1 of precipitation is left.

2 Finally this other component
3 of number of days of frost is greater along the coast
4 than it is at Aklavik and Inuvik. Next, please.

5 We'll now take the old delta
6 portion and start with the forest, forest tundra in the
7 south,
8 move on up north and into the tundra. The first slide
9 is to illustrate again the general relationship of
10 topography, soil development and vegetation. We'll come
11 back to this later on in terms of wildlife. But in
12 upland areas, the soil being very thin, shrubby vege-
13 tation, many times only low cushion plants. Even in
14 these latitudes that you will see in a minute, sir,
15 just to the south of Inuvik on dry exposed slopes a
16 considerable amount of white spruce and even white
17 birch. So it is again well-drained but fairly deep
18 packed there. On poorly drained slopes that are either
19 gentle or almost flat, black spruce is found in perfect-
20 ly drained soils and a shallow active layer, and gener-
21 ally speaking, a lower nutrient content to this kind
22 of regime, plant growth in general is less. Along
23 streams shrub communities occur, as well as closed
24 forests, and finally out in the very poorly drained
25 areas, fens or sedge areas predominate. Next, please.

26 This is flying over the very
27 area just to the south of the Mackenzie River at Point
28 Separation in what is referred to as the Peel Plain,
29 where there is this interesting combination of areas
30 that are slightly better drained where there are open
black spruce forests and an abundance of lichen cover

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1 on the ground, a very important component in the winter
2 feeding of caribou on to the west, and always there are
3 very frequently adjacent to these areas, lakes in
4 this particular case, one is filling in quite rapidly
5 with vegetation. It's very important habitat for
6 muskrats or waterfowl and the like.

7 Coming close to Inuvik, open
8 grown black spruce forest, trees that are frequently
9 100-150 years old, yet only 15-20 feet in height, and
10 3 to 4 inches in diameter. Again you see this under-
11 story of shrubs and again the abundance of lichen in
12 these areas that are reasonably well-drained. On the
13 hill beyond where the active layer is deeper, where
14 it is a warmer site in the summer, white birch occur.
15 You see this pattern of sorting out of species in
16 response to soils; soil development, soil temperatures,
17 depth
of the active layer. Next:

18 This is very near Campbell
19 Lake, which is one of the proposed I.B.P. sites where
20 again because of its slope exposure, warmer soil,
21 white spruce rather than black spruce occurs, and this
22 interesting little shrub flowering in late June, the
23 Lapland rosebay or the Arctic rhododendron. This shrub
24 occurs up into the Arctic but it grows only a few
25 inches in height, while here within the northern edge
26 of the forest it may be a foot or so. Next.

27 Flying onto the east then
28 in the general area of ^{Lake} /Sitidgi or Sitidgi Lake you begin
29 to see the forest break up, still on warm slopes and
30 exposures a combination of spruce and birch there and

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1 back here, but where in this general view you can see
2 the individual trees standing out, the forest is no
3 longer closed, it is a ^{very} open situation. This is the true
4 forest tundra, it is in this area that caribou spend a
5 considerable portion of a winter, especially to the
6 west, not in this immediate area but you'll see later
7 on this is habitat, potential habitat and habitat that
8 has been used in the past for the reindeer herd. The
9 lake here, a warm body of water in summer, quite well
10 covered with water lilies. Again an important environ-
11 ment for especially muskrats. Next.

12 Moving another 20 miles to
13 the north, the very edge of the forest where there is
14 just scattered forest tundra, where there are scattered
15 trees, this particular one shows the shiny bark, the
16 product of wind abrasions, snow in the wintertime, typi-
17 cally snow depth would lie along in here and there
18 is frequently this little skirt of shrubby branches
19 at the base. Occasionally a leader/^{can} make its way above
20 this, can survive and slowly but surely grow but one
21 can usually look at tops of this trees of
22 this kind and get a pretty reasonable idea of average
23 winter snow depth. Next.

24 Within the northern forest,
25 this open forest as well as the forest tundra, fire
26 is quite frequent, as those of you who live in Inuvik
27 well know, in terms of the 1968 fire. This is several
28 years later flying again onto the east pretty much into
29 an area of scattered black spruce in the drainages but
30 what had been tundra on the hill, and about 4 years

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1 after, five years after the fire the cottongrass that
2 was already present in this kind of an environment is
3 flourishing, as evidenced by the cotton head, the
4 plants have flowered and set this mass of seed with
5 their^{cottony} surroundings and it's very visible from the
6 air. It shows then that in a period of four to five
7 years that out into the tundra there is considerable
8 amount of recovery of vegetation following such a fire.
9 Next, please.

10 Coming back then, near Inuvik
11 and again about five years after the fire the abundance
12 of fireweed in August being evident. So that there
13 are recuperated capabilities of these landscapes and
14 in different components of these we find different
15 kinds of plants coming in. Next.

16 This slide briefly summarizes
17 then the fire record history for this area gathered
18 by Helios Hernandez from the records available to him.
19 The forest tundra region here in this delta area,
20 relatively few fires covering what might appear to be
21 a reasonable amount of area,
22 137 square miles, yet in terms of this total block that
23 we looked at it's only 4%, and the average fire in size
24 is about six square miles. Fires occur^{out} into the tun-
25 dra -- we'll see this in a little bit. There are few
26 of them, they're much smaller in total area they had
27 burned, and the individual fire in turn is very small.
28 Why is this the case? Largely because of potentiality
29 for fire in the different kinds of vegetation to
30 carry fire. The forest tundra with a lot more biomass,
a lot more material being dry, has a greater capability

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1 of carrying the fire as opposed to the tundra.

2 Let us now love into the tundra
3 proper. This particular diagram is based on information
4 from Richards Island, but it could be equally based in
5 the Parsons Lake area or elsewhere north of treeline,
6 Again with uplands situations such as we find on eskers,
7 gravels exposed at the surface and dry summer soil
8 conditions, cushion plants prevail. On slopes, low
9 shrubs of birch^{and} willow occurring along with other
10 associated species. On lower portions of the slope where
11 soils are more imperfectly drained, like here and here,
12 cottongrass tussock vegetation occurs with little low
13 heat species; tall willows typically occur along the
14 stream drainages in response to average depth of winter
15 snow. As a generalization, shrub height in many of the
16 Arctic areas is in proportion to the depth of snow,
17 especially in notches along streams and the like. That's
18 not so true of the alder out on general slopes but it
19 is in these kinds of situations that usually hold; and
20 finally then in very poorly drained areas again the
21 predominance of sedges. In turn then, differences in
22 active layer with there being less of an active layer,
23 shallower thaw, colder soils under the sedge mat as
24 opposed to the slopes here of cottongrass, and those
25 in turn being less in depth and less warm than the
26 shrub dominated areas on upper slopes and ridges.

27 If we can now then go through
28 a few slides to illustrate these. This is a fall
29 view along the Holmes Creek just south of where it
30 empties into East Channel. In these kinds of situations

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1 we can see the black spruce extends well up into the
2 tundra, but only in these protected ranges where it's
3 warmer in the summer because it somewhat of a sun bowl
4 effect, and in turn in winter it's more protected,
5 there's more snow and conditions aren't as severe.

6 Adjacent to this then is the
7 upland area with the predominance of shrubs. The bril-
8 liant color here is for birch, with a little bit of
9 crowberrymixed in with it. The yellow are the willows.
10 Actually the same species of willow here as here,
11 but again illustrating that this is a more severe envir-
12 onment for the willow to grow than here. As a result,
13 it's a foot and a half in height here as opposed to
14 five or six feet along the stream. Next.

15 A general view south of that
16 about 30 miles showing two important things: First and
17 foremost again a general pattern of vegetation in
18 relation to topography. Raised centre polygons here,
19 poorly drained areas, little ridge areas with a predom-
20 inance of willow shrubs, the general sloping upland areas
21 but in perfectly drained soils with their cottongrass
22 tussock vegetation, and a partially drained lake out
23 through this channel. It drained quite rapidly and is
24 quite well filled in now with sedges and grasses and
25 not well focused on it, but yet nevertheless evident
26 are whistling swans. Next.

27 Down on the ground in some of
28 these very same areas where there are eskers of gravel
29 material, again this beautiful combination of the birch
30 and willow along with green alder which have not yet

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1 changed color^{yet} It's very easy for ecologists to sort out
2 vegetation in most areas in the world where there is
3 fall coloration at that time. It's the easiest time, as
4 well as the most fun, and an aesthetically pleasing
5 time to visit.

6 The next slide illustrates it in
7 these same kinds of landscapes. This is where we can
8 define the grizzly bear dens. They are difficult to
9 spot. This doesn't show up very well in terms of the
10 cloudy day under which it was taken but it is in the same
11 kind of landscape as in the previous picture. Next.

12 In the spring of the year the
13 tundra is not attractive as the snow melts off. It's brown
14 and appears barren; but literally this is the time when
15 there is a greater amount of teeming life, especially
16 associated with the early nesting of birds. This is
17 just south of Tuktoyaktuk. You can see the two large
18 pingsos. ^{At this time of year the} ptarmigan are already nesting and the next view
19 shows a month later the female with one of her chicks
20 in this position. One of the other very interesting things
21 about the north is the speed with which biological
22 activity gets under way.

23 The previous picture was taken
24 on the 7th of June; this was the 30th of June. Less
25 vegetation, the birds have incubated their eggs, the
26 young have hatched and they're well on their way to
27 growing. Next.

28 The most common bird in the
29 area of the song birds -- of actually all of the birds --
30 is the Lapland longspur, which shows here. It's not a

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1 species which we tend to concentrate on simply because
2 it's smaller in size, less conspicuous, and we obviously
3 hone in more directly in terms of swans, geese, and
4 ducks. But if we really look at the species that are
5 present and their abundance, this is by far the most
6 important one. Next.

7 But not to leave out the swans,
8 a pair and their signets. Most lakes that are of
9 medium size will have one pair; some of the larger
10 lakes may have two or three pairs nesting on them.
11 Shrub tundra in the background. Next.

12 Fire in turn occurs into the
13 the quantitative
14 tundra but as/ data have shown they're typically small
15 in extent; they seldom occur, and they're easy to stop.
16 This one, interestingly enough, was stopped by a seismic
17 line. Why? Because in the summertime when the fire
18 occurred there was more lush grass growing along this
19 line, it actually provided a natural fire break.
20 That's 1974, that's the same area on the ground in 1975,
21 again illustrating this business of relative rapid
22 rate of recovery. These plants were not killed off, they
23 are beginning to re-grow. Yes, the taller shrubs were
24 not ~~back~~, but the smaller ground shrubs and especially
25 the grasses are coming on abundantly. Next.

26 This is further demonstrated
27 then by an old seismic line showing the abundance of
28 native grass, and as you know from the various testi-
29 monies that have been given, it was this finding of those
30 native grasses in 1969 and '70 that led us into our
first research related back then to re-vegetation. Next.

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Now, let's move from the area out beyond in the Parsons Lake area and on up to Richards Island into the Caribou Hills proper. This shows the steep west-facing exposures on the top of the hills in this manner; and at the base of the hills the Ranger Station. Very briefly, the history goes something like this, that reindeer were/^{introduced} into Alaska in 1892 to 1902. They did very well in that area. The Canadian Government felt that because of this that this might be a species that might be brought to Canada and could be established and used successfully here. As a result of this, a Commission was formed in 1919 and this was followed through in the late 1920's by Dr. Porsild and his brother, who did a general survey in this area down to as far as Great Bear Lake. The end product of this was that they made an agreement with the Alaskans to drive a herd to Canada. This took a period of four years, culminatingⁱⁿ the arrival of approximately 2,500 reindeer at this location in 1935.

The history of this herd has been a colorful one, as we know. It has oscillated very significantly in size up to as many as about 9,700/^{animals}down to a low of around 2,700. If I understand correctly now, it is at a level of about 5,000. The Reindeer Station was a very active station for a period of time and even had its own Post Office and approximately 80 to 100 people lived at this location for a number of years. This was taken about three years ago. That's one aspect of the importance of this area. The other is its biological current as well as past biological,

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1 and that consists mainly of the kinds of plants that
2 are found on these slopes, that now literally go up
3 to this location. These dry slopes facing west and
4 south contain an interesting combination of plants that
5 are found further north and further east than elsewhere
6 in the Canadian Arctic, and as a product of this the
7 people involved in conservation aspects of the inter-
8 national biological program have recommended that this
9 portion of the Caribou Hills be set aside, and as you
10 know this is well-documented on maps. I merely wanted
11 to show this to ^{again} illustrate this aspect; and again an
12 interesting bit of ecology that this slope is totally
13 different environmentally and vegetationally than this
14 north facing slope over here with it's shallow, active
15 layer depth, cold soils, tundra vegetation and black
16 spruce. Over here, white spruce, paper birch and all
17 of its associated warm site plants.

18 A little bit then in terms of
19 the patterning of the reindeer herd. Back in the '50's
20 and '60's, Richards Island was extensively used. At that
21 time the management patterns were different than they
22 are today in terms of a greater concentration of the
23 animals in limited areas and it was felt after a period
24 of years that there was a significant amount of over-
25 grazing in summer, especially with regard to lichen
26 cover. As a result of that, the current practice is to
27 use the Tuktoyaktuk Peninsula for summer range.

28 Now this map is based on
29 information obtained that Dr. George Scotter gave at
30 the University of Alberta back in 1970. At that time

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he recommended that in terms of the reindeer range, the reindeer preserve, the southern portion, mainly the forest tundra and down into the forest is the proper winter habitat, the area around Parsons Lake and south of it and onto the Eskimo Fingers, spring habitat, and in the summer range either one of these. We know, though, that in terms of the pattern of use that it varies from year to year. As a matter of fact, last year the reindeer remained around Parsons Lake by and large, using what on this map would be spring range and I believe I'm correct in saying that at the present time the herd is wintering even further north.

In turn, it's interesting to note and fortunate to note that in the last two years the Inuit have taken over the management of the herd, people from Tuktoyaktuk, there is still some government supervision, I believe; but the main management is now in the hands of native people. We can only hope that this will have a continuing good history of proper management and utilization. WE'll come back to utilization in a little bit. Next.

The next two slides then illustrate a little bit about the ecology of the reindeer herd. The spring of the year, April, calves have been born, dark-colored animals showing up in very numerous fashion. They paw down through the snow to get vegetation. There are several things that are involved here: Depth of snow, density of snow, as well as what they find after they have dug a crater. So that all of these things enter into then the determination of proper

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1 rangeland. It's more, in other words, than just what
2 will they find after they've cratered. Equally of
3 course, if not of greater importance, is can they crater
4 down to the vegetation? The next slide shows this a
5 little better.

6 It shows them working away
7 developing craters. Next, please.

8 The Eskimo Fingers area
9 recommended by Scotter as spring range. It is at the
10 present time little, if at all, used by the reindeer
11 herd. It is within the reserve. It is very interest-
12 ing aesthetically, but also biologically very important
13 not only because of its potential for reindeer, but
14 also its actual utilization by waterfowl and the like.
15 As a matter of fact, we'll come back to this near the
16 end of the presentation. This is a part of another
17 I.B.P. proposed site. Next.

18 Moving out then to the summer
19 range of the herd out into the Tuk Peninsula, a
20 seemingly black relatively monotonous landscape, an
21 occasional pingo, low vegetation, a few shrubs but
22 not very many, quite sandy soils; and on the ground the
23 next view gives this impression of flatness. Next.

24 Finally, on this radiant
25 topographic relationship, depressions with their cotton-
26 grass. This kind of cottongrass forms a turf as opposed
27 to the tussock cottongrass on the slope or gentle
28 basin here, and the slope beyond with its shrubs. This
29 kind of habitat is used relatively little by wildlife,
30 yet there are birds that come into here for feeding on

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1 insects but relatively little other use other than
2 just potential onto the north and west for geese in
3 feeding. This kind of habitat is widely used for
4 bird nesting as well as for lemming and other small
5 rodents. The slopes are very important again for bird
6 nesting as well as some of the larger animals. Next.

7 So much for the old delta.

8 Now, let's move to the present delta and divide it
9 into two components, because biologically they have
10 very significant differences between the treed portion
11 and the non-treed northern portion. Let's then take
12 the central and southern portion, the treed portion,
13 and briefly look at it. Adjacent to the river, mud-
14 flat areas, sometimes with horsetails. This over time
15 is covered by willow vegetation with other species of
16 horsetail frequently associated, and other herbs.
17 As site matures in time and as the permafrost table
18 widens because of its distance from the river, as
19 well as the impact of vegetation, this over time is
20 converted, although in only local small areas to
21 areas of balsam-poplar. Of course, this is one of the
22 main trees in the importance of beaver, although in
23 general I think it's safe to say the beaver population
24 in the delta are relatively low.

25 Finally, white spruce enters
26 the picture, forms a white spruce forest, under
27 these conditions it's a very shallow active layer of
28 a completely different kind of environment.

29 Let's now go through a few
30 slides to illustrate it. This is showing the river

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1 in the springtime during flooding, it looks like nothing
2 but a sea of water and yet several months later in the
3 autumn again this beautiful pattern of trees and willows.
4 Now we're dealing with white spruce again, warmer soils
5 and a warmer environment as opposed to the black spruce.
6 The willows are medium to tall willows, five to 10,
7 sometimes 15 feet in height. Small areas of sedge
8 marsh and even areas of horsetail up here in the slide,
9 although they're not very extensive.

10 Another important feature in
11 the slide is this reverse delta system where a portion
12 of the river water each year flows out into this, bring-
13 ing its added nutrient component. This becomes very
14 important then in development of horsetails; it also
15 provides a much better environment for muskrats and
16 indeed for the spawning of northern pike. Next.

17 A general view then at the edge
18 showing the willows and back into the white spruce
19 forest. The pattern is one of successional sequence
20 of the establishment of felt leaf willow, along the
21 edge of the bank on back to a closed stand of willow
22 which is important habitat for moose, not so important
23 in the Mackenzie Delta as where I first cut my teeth in
24 northern ecology on the Colville River in Northern
25 Alaska. I had two projects that year, and one of them
26 was to sort out the successional sequence of this
27 kind along the river system. There were lots of cow
28 moose with their calves, and I was running around with-
29 out a vehicle, tip-toeing if you will, through the
30 willows trying to do my field work without agitating

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1 and exciting the animals that were crashing through the
2 brush a quarter or a half a mile away, the impact being
3 that this is important habitat potentially for moose
4 as well as in the wintertime being very important habi-
5 tat for snowshoe hare. They live extensively off the
6 willow. In turn you can see that there's a nice
under-story of herbs and finally on into a white spruce
forest with its essential closed vegetation, closed
canopy and a much shallower active layer and a much
more complete cover of herbs and shrubs which are
totally different kinds than under the willow. Next.

12 This then is a ground view
13 of one of these little reverse delta areas and ponded
14 areas with its nutrient enrichment, its abundance of
15 equisetum or horsetail and its very fine habitat then
16 for the spawning of northern pike, Next.

17 An aerial view again to illus-
18 trate the sort of thing that a lake such as this has
19 relatively little in the way of nutrient addition, it's
20 biologically much poorer. It will support muskrat,
21 yes, but a much lower density and productivity than a
22 smaller lake such as this, that does get its annual
23 nutrient enrichment. Next.

24 Here then, a man setting a trap.
25 I think I'm correct in saying that in 1971 to '73
26 roughly 45 to 49,000 muskrats were taken by the communi-
27 ties of Aklavik and Inuvik. But this portion of the
28 delta, the treed portion of the delta is very important
29 biologically in terms of its ability to produce these
30 animals. Next.

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And to maintain quite a high level of harvest. Let's now move to the outer delta beyond the trees. We see the same general pattern except here, a lot of bare beach with not much of anything coming in, willows becoming established, the back slopes then with willow and sedges, or just a plain sedge marshy area, if it's very poorly drained. Next.

From the air the pattern is very evident. The levy situation, the higher, dryer, better drained areas with willow and the wet sedgy marshlands beyond. It is this kind of habitat that is so essential in terms of many of the waterfowl in partly nesting, but even more importantly as you'll see from some of the other slides in terms of the fall staging and fall feeding prior to migration south. This is along the east channel of the Mackenzie, very dramatically showing the new portion of the delta with its complex of willow shrubs and sedges as opposed to the old delta, Richards Island, with its upland shrubs. Next.

Looking straight down on this kind of landscape, a mosaic pattern of open shrubs, willows, 5-6 feet in height, but much of the land covered with sedges. Very wet, soupy situation. On the ground the willows in many cases show a solid cover such as this. Again in the summertime this kind of habitat is relatively little used by wildlife, but in the wintertime it becomes very important again for hare, snowshoe hare and their feeding. Next.

This shows the same pattern

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1 then on the west side of Richards Island, with the extensive
2 sedge marsh area so important to waterfowl. Next.

3 Let's focus, then, on water-
4 fowl and some of the patterning situations in the delta
5 area. Very important feeding, production, and moulting
6 areas for ducks occur in the Eskimo Fingers area and
7 the upper portion of the Tuk Peninsula. The spring
8 staging for geese is very important in this area. As
9 you know, the Kendall Island Migratory Bird Sanctuary
10 has these kinds of boundaries which I believe in part
11 result from geographic boundaries and present information
12 would indicate that biologically the line really ought
13 to be drawn a bit differently.

14 I'd like to use this to demon-
15 strate the great value in the kinds of research that
16 have been going on in the last few years, and what they
17 tell us now in terms of management practices that literally
18 if people had to do it again, I believe they would
19 draw the boundary around this sanctuary in this
20 manner because there is much more biological information
21 now to show that that's the key area biologically for
22 these birds, as opposed to including this portion here.
23 So truth is only insofar as we know it today, and
24 over the next few years as over the past several years,
25 as we gain more insight into these things we can modify
26 our understanding of them and hopefully have a better
27 understanding in terms of management than of these
28 populations. This area then serving as a very import-
29 ant migratory route then for the snow geese going on,
30 the bulk of them going onto Banks Island to nest over

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1 summer, but then returning in the fall to this area
2 just to the west of Richards Island that is so important
3 then in the fall, feeding the so-called fall staging.
4 In turn then there are many species of sea birds who
5 fly back and forth along this route here. So that this
6 outer delta portion then becomes very, very significant
7 from the standpoint of bird populations and their
8 dynamics. Next.

9 Snow geese in the spring of
10 the year, as they move on north at the outer portion of
11 Richards Island. Next.

12 Sandhill crane nesting, grazing
13 in these lowlands areas. Next.

14 A bit of sundry information
15 then that we have learned in the last few years with
16 regard to bird populations and their dynamics. As a
17 generalization again this shows that there are more
18 species of birds that nest and breed in the delta than
19 along the Yukon coast to the north. Roughly twice as
20 many, 112 versus 66; and in addition to that then there
21 are other species that migrate through or are occasional
22 visitors in the delta.

23 If we then compare bird densi-
24 ties in terms of the lakes on which they nest and breed
25 the flood plain lakes versus upland lakes is an inter-
26 esting relationship, in that the upland lakes are
27 actually more productive at a higher bird density than
28 do the flood plain lakes, and in turn it's better to
29 have many small lakes in terms of productivity of these
30 birds than many large lakes. As we increase lake size,

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1 we literally decrease the density of birds per lake.

2 So there are two interesting relationships there.

3 If we then go and take the
4 outer delta as such and compare it with the upland
5 tundra, we see that the reverse is true. Bird density
6 is much higher in the outer delta than on the old delta
7 that we've been looking at earlier on. In turn, inter-
8 estingly enough, again the little birds, the passerine,
9 the song birds that are most numerous, 78% of the total
10 population consists of those small birds, as opposed
11 to shore birds and waterfowl that we again ^{tend} to hone in
12 on, they're larger in size, they're economically more
13 important, we for a variety of reasons are attrac-
14 ted to them. But if we take the hard information and
15 relate this, we see that in fact the greatest number
16 are small, and that even increases them in terms of
17 the upland tundra, a far greater percentage being these
18 song birds. Next.

19 We mustn't leave out the fish.
20 Gill-netting off the coast to determine population
21 dynamics. This is one of the things I was trying to
22 get across in Yellowknife last week. It's easy for us
23 botanists to go out and figure out what's there, what the
24 species are and to begin to manipulate things and figure
25 out how they behave or respond to environmental impacts.
26 It's much, much harder to do this from the standpoint of
27 wildlife, and the most difficult component of all are
28 the fish. Dr. Wilimovsky spoke to this. You've got to
29 find them down through murky water first before you can
30 begin to figure out how many there are, what are their

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1 population dynamics, what is their ecology in terms of
2 where do they spawn? Where do they over-winter? What
3 are their food requirements? So a search of this kind
4 is fundamentally important before you can ever get to
5 a point that you can begin to manage a population or
6 begin to calculate what impacts will be on those
7 populations.

8 The next slide then briefly
9 summarizes a few of the species that are found in the
10 area, the Arctic cisco here and the least cisco over
11 on this side, cod in this position, sculpins here, and
12 over on the far side a boreal snout. These are off-shore
13 species out into the estuary, although the ciscos are
14 anadromous fish, they live part of their life in the
15 sea and spawn back in the rivers, as you know, so that
16 this merely gives you some idea of the diversity. The
17 next slide, I believe, will hone in on other aspects
18 of the fish.

19 In the Northwest Territories
20 41 species have been identified. Most of those are
21 found in the total Mackenzie River drainage, so it's
22 a very important river again biologically in terms of
23 the diversity of fish that it contains. The Mackenzie
24 Delta channels themselves contain roughly 12 species. The
25 estuary is richer because this is the contact between
26 freshwater and marine water. So that there are a greater
27 number of species that live in that kind of a regime,
28 the delta lakes have even fewer, although a very
29 significant number nevertheless. Next, please.

30 This slide then demonstrates

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again a little bit, we have already seen these figures in terms of the number of species in the channels and in the lakes, but this documents a little bit the most important species that are found in these different environments and finally, a little bit of data to show the number of years that it takes for a given species of fish to reach a given size, specifically the broad whitefish reaches a size of 400 millimetres in the lakes in roughly 4½ years, in the Mackenzie River a little over 6 years. The significance of these data are that literally the productivity, the growth rate they need for the early years are a bit faster in the lakes than they are in the MacKenzie River. This is not to say the Mackenzie is not productive, but it is not as productive in some aspects of fish biology as the growth rate shows here in terms of a lake system. They're both important but in this case they do actually grow faster in the lakes than the river. Next.

Finally, let's move out into the estuary, an area that we know less about because until the last several years ^{there} was very little information available. This particular estuary is quite rich biologically in productivity and in terms of productivity and yet if we compared that estuary with other marine or freshwater environments, we can maybe put it a little bit into perspective in a sense that it's ability to produce plants, vital plankton and chlorophyll is at about the same level as some of the high Arctic less productive lakes. The high Arctic lakes that are more productive in terms of char are about two or three

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1 times the rate of production of chlorophyl or plankton
2 if you will, as the delta has and in turn this is also
3 true then of some of the lakes in this general region
4 that are more productive in terms of their ability to
5 produce plant food than this estuarine area is. This is
6 not to imply that it is not important, but again to
7 begin to put it a little bit into perspective, and
8 again we get this perspective only by research in
9 different areas.

10 Coming to the main point, the
11 most significant biological aspect of this area of
12 course relates back to beluga or white whale. We see
13 that the areas of concentration are in Kugmallit Bay here,
14 out in this general region near some of the offshore
15 islands and finally over from Shallow Bay on the west
16 side. They move throughout this area and in fact this
17 is not the total population. I think I'm correct in
18 saying that the current estimates are roughly five
19 to 6,000 animals in the Beaufort Sea area here;
20 roughly two to 3,000 of them come into this area in the
21 summertime. They come in typically in June in the
22 leads that open up in the ice, and remain until mid-
23 -- till late August. Why do they come in? The present
24 information indicates that they come in to calve, this
25 is warmer water. The young do not have much in the way
26 of a blubber system to keep warm, therefore they come
27 into these warm river systems for calving rather than
28 feeding. In the summertime there is very little in the
29 way of stomach content of animals within these -- I'll
30 try it again -- their stomachs are essentially empty.

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1 There is no real indication that they are doing much
2 of any feeding. Now, this slide is not the delta.
3 This is the North Coast, the Cunningham Bay area on
4 Somerset Island, a slide, a picture that I took about
5 three years ago helping Dr. Sergeant survey this island
6 one day in terms of its population. In this particular
7 view there are roughly 350 whales and as you can see,
8 there are numerous cow -calf combinations, as another
9 one shows here, and some of them actually show in
10 here. But this illustrates very vividly what we are
11 sure goes on in the delta but because of its murky
12 water you can't easily see it.

13 The next slide then comes back
14 to the delta and you can see a pod of white whale
15 here. Next.

16 A very important resource then
17 for the native people, this shows cutting up a whale
18 at Tuk a couple of summers ago, when we were up with
19 some of our Summer School students with the course
20 that's taught in Inuvik, by the University of Alberta's
21 extension program.

22 The next slide shows cutting
23 up whale meat by a native Inuit lady at Aklavik.
24 ~~W~~ales are used not only at those two communities, but
25 these in fact are two of the most important ones.

26 The next slide then attempts
27 to summarize a little bit of the information with regard
28 to whale. From the Slaney Reports, '72-'74, this
29 information relates then to when the animals arrive.
30 They're coming in in these leads that open up in the

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1 sea in June, if it's a late year in terms of ice
2 opening up, and they may be delayed until early July.
3 IN turn, their departure is somewhat related to when
4 biologically they get started their summer activities
5 in the delta. So in '74 they were late in arrival
6 and they were later in departing. The population esti-
7 mates then vary from year to year. Part of this is
8 obviously the ability to see the animals as well as
9 the potentiality for different numbers coming in from
10 year to year.

11 In turn then this gives some
12 idea of the number of whale that native people take.
13 Earlier information, 1954, 206 individuals; 1959, 145;
14 and then in more recent years roughly 110 to 180 anim-
15 als. This averages out, taking this limited data, but
16 it's the best that we have, to roughly 150 per year.

17 I then tried to calculate and
18 checked with several people to get some idea at this
19 stage of the game as to whether the harvest is somewhat
20 in keeping with production rates, because this is always
21 one of the keys. Are we able to maintain a population
22 of wildlife harvested, and yet not exceed what that
23 population can reproduce in its normal losses through the
24 year, and keep a reasonable balance? Now, I have tried
25 to err on the high side purposely of utilization, estimating
26 a population then at 3,500 animals, and assuming, which is
27 a reasonable assumption, I'm told, that there are
28 roughly 60% of those animals are adults capable of
29 breeding. Roughly speaking, a female can breed at the
30 age of eight; a male is capable of breeding at the age of

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1 five. In general, a female will give birth to a calf
2 every two or three years. I took the high side saying
3 she can breed only every three years and therefore
4 in terms of this roughly 416 calves will be born per
5 year. We know in terms of these limited data that
6 roughly 150 animals are taken per year. Again erring
7 very much on the high side, saying that the loss
8 in terms of animals killed but not able to be harvested
9 is an equal 150. We know again from the present data
10 that the loss is roughly in a range of 30 to 50% rather
11 than 100, but again I wish to err on the high side.
12 This would indicate that at maximum, with 150 harvested,
13 and a maximum loss of 150, a total of only 300 as
14 opposed to roughly 400 births. This is erring on the
15 low side in terms of production. This is erring on
16 the high side in terms of utilization.

17 If this is at all in balance
18 then, if data are all real, then it certainly indicates
19 that the current rate of harvesting is in keeping with
20 maintaining this population. Now I would again submit
21 that it is only within the last three years or so that
22 we're beginning to get enough data for estimates of
23 this kind, no matter how crude they are, can begin to
24 be made. Important information for maintaining
25 and living with these kinds of resources. Next.

26 Not last but least of the big
27 animals in the outer delta area is the polar bear, an
28 animal that roams through this landscape of the outer
29 delta every winter, an animal that is now becoming
30 increasingly in contact with man. So that one of the

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1 potentials here is in terms of the hazards, the poten-
2 tial hazards of contact with people. You and others
3 are well aware of this sort of thing. The top carnivore
4 in the system, a very important one. A few of these
5 den along the North Coast and the Yukon as well as
6 on out into the islands and as you know, they roam over
7 vast areas. They're a stealthful animal, a very diffi-
8 cult one to perceive this bear if you're on the ground
9 and have no aerial surveillance until it's too late.

10 Next.

11 I've referred periodically to
12 these I.B.P. sites and I merely wanted to come to this
13 at the end to again show the Bird Sanctuary, which
14 again if it were re-drawn now I think biologists would
15 agree it would have somewhat of a different shape in
16 terms of the importance of that unit of land. The
17 Caribou Hills area and the adjacent portion of the
18 river or of the mid or northern delta portion, mainly
19 important in terms of its plant assemblages.

20 The Campbell Lake area
21 importantly unique in terms of its physical landscape,
22 some of the plant species that are found there, and
23 especially the raptors that nest in that area.

24 The smaller area down the
25 south end of the delta, because it is representative
26 of the forest tundra, so it's more -- I'm sorry, the
27 forested portion of the delta -- it is more than in
28 terms of keeping a representative sample as opposed to
29 anything particularly unique with regard to that area.

30 Finally, this large area over

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here that's been proposed, the Finger Lakes, the Eskimo Fingers area, a combination, river systems flowing in and this ^{large} tidal mud flat, an importance therefore for wildlife mainly related back to waterfowl.

Contained within the Reindeer Preserve is the potential spring to winter habitat for those animals. I believe the next slide is the last one.

Again a relatively crude attempt to summarize some of the data that are available in terms of human utilization in this area. The native people, the Inuit and Indian in this area harvest roughly 500,000 pounds of fish a year in these various communities -- Inuvik, Aklavik, and Tuk. The Holmes Creek provides a commercial fishery resource. They are limited to roughly 50,000 pounds per year, and it is quite easy to obtain that amount of fish each year. The native people in turn use a considerable number of birds -- ptarmigan especially along with geese and ducks. In Inuvik in '71-'72, approximately 2,000 birds, and in Tuktoyaktuk the same year, twice as many, 4,000. The overall estimates of whale utilization is roughly 150 per year. The fur sales in Inuvik, \$139,000 in '68-'69, and \$91,000 in '71-'72, and approximately \$60,000 in 1972-73. Aklavik, \$89,000, \$59,000 and 60,000 in '62-'63. Tuktoyaktuk, 12,000, 34,000 and 35,000 in '72-'73. A very important resource.

Finally, last but certainly not least, the ability to harvest the renewable resource of reindeer, approximately 500 to 1,500 animals per year.

In closing, I'd like to again
e can have the lights on, if
a area is exceedingly import-
ombination of reasons. The
ositionary between forest
has a strong component about
s as well as tundra. Because
a with its warm water and
it enriches the estuarine
than the land to either side
ult of this, the overall
s higher than we would expect,
r side.

But one qualifier in terms of this. Although this is true, one is impressed as they fly over the landscape, as I do each summer, a variety of areas, that one seldom sees wildlife. It is there but it is not as visible as it is in some areas, and literally I think I am safe in saying that as a system and the larger animals we tend to see in relation to that system, it appears many times to be not as rich as for example the Colville River, which flows from Northern Alaska out to the sea on the other side of Prudhoe Bay.

Caribou are more evident there than reindeer here. Moose are more evident there than they are here. These are some of the relationships. In turn, in terms of its productivity, it is no more or as great as the island of Banks, with its tremendous capability of producing foxes, muskox, and

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1 prairie caribou. So it's a very important area biologi-
2 cally, provides a relatively large food base for many
3 people in the area and yet it is no more productive,
4 if in fact as productive, as other areas within the
5 ARctic in these general latitudes that we can point to.

6 But we can only make those
7 statements again because of the significant increase
8 in research that's gone on in the last five to ten
9 years.

10 THE COMMISSIONER: Thank you
11 very much, Dr. Bliss. That was very, very interesting
12 and helpful. It must be around 12:30 now, is it?

13 MR. BALLEM: 12:45.

14 MR. BAYLY: Mr. Commissioner,
15 I'm grateful that this evidence has come on. I do note
16 that there was an awful lot more evidence than appeared
17 in the written summary, and I don't fault Mr. Ballem for
18 that. It may well be Mr. Scott's fault for not explain-
19 ing the rules properly; but we may have some difficulty
20 responding to some of the things we've just heard
21 early this afternoon, and we haven't had a chance to
22 look over some of this material; but it may be that we
23 will be asking either Mr. Ballem or Mr. Scott to
24 bring this witness back if we are unable to cross-examine
25 him in the usual way following the presentation of his
26 evidence.

27 THE COMMISSIONER: Well, that
28 can be sorted out. Well, we'll adjourn then until two
29 o'clock. 2:15, all right, and we'll try this week to
30 follow the usual hours of sitting. But perhaps if you

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1 gentlemen -- those hours in Yellowknife are 9:30 to
2 12:30 and then 2 till 5, but if you gentlemen -- I'm
3 thinking of you in particular, Mr. Ballem -- want to
4 discuss that with Mr. Scott, and suggest a different
5 arrangement, it's perfectly all right with me.

6 But we'll come back at 2:15
7 anyway.

8 (PROCEEDINGS ADJOURNED TO 2:15 P.M.)
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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

THE COMMISSIONER: WE will
come to order, ladies and gentlemen. What's next on
the program?

MR. SCOTT: Perhaps finish with
Mr. Bliss.

Perhaps I might just
MR. BALLEM: advise everyone
concerned that we have filed 30 copies of the Shell
supporting documentation for land tenure agreement
application with DIAND with Miss Hutchinson and those
people who are in ^{the} normal course of events would have
copies can get them from her.

THE COMMISSIONER: Fine, thank
you.

MR. BALLEM: I have finished
with Dr. Bliss and he's available for cross-examination.

MR. SCOTT: Mr. Marshall was
first on my amended list.

MR. MARSHALL: I have no ques-
tions of this witness, sir.

MR. HOLLINGWORTH: I have
no questions.

MR. SCOTT: Mr. Bell isn't
present, therefore Mr. Bayly I think is next.

MR. BAYLY: I have some
questions, Mr. Commissioner.

CROSS-EXAMINATION BY MR. BAYLY:

Q Dr. Bliss, in your
evidence this morning you referred to the relative

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1 productivity of the Shallow Bay area of the Mackenzie
2 Delta, and you compared it with the productivity of
3 lakes in higher Arctic islands and am I correct in
4 assuming that when you were talking about productivity
5 you were talking about the ability of that body of
6 water to produce chlorophyl.

7 A Yes sir, to produce
8 plankton, which contains chlorophyl. That might be
9 expanded just a wee bit to explain why this is the
10 case, why the productivity is not higher than it is.
11 It is largely related back to the silt load, and the
12 inability for light to penetrate to any depth. So
13 that there are good reasons why the productivity is
14 not higher than one would assume, considering that
15 you have warm water and a high nutrient load.

16 Q Now, when you talk about
17 low productivity, that isn't necessarily the same
18 thing as supporting a large number of species, and
19 you've said that this area does support a large number
20 of species.

21 A That is correct. The
22 information that I was using at that point was only one
23 measure of productivity. It's obviously an important
24 one in that this is at the base of the food chain but
25 certainly in looking at a total ecological system one
26 has to consider many other components.

27 Q Now, if we compare, if
28 we carry your comparison of Shallow Bay to a lake on
29 an Arctic island through, I take it that the Shallow
30 Bay supports a larger number of species than the

1 average Arctic lake.

2 A No question. Most of the
3 high Arctic lakes have only Arctic char, and as we've
4 said this morning, there are on the average 15 to 20
5 species of fish in that area specifically, in the estu-
6 rine area 20. The diversity of invertebrates is far
7 greater in Shallow Bay than it is in the high Arctic
8 lake .

9 Q Now, I take it that if
10 you're looking at productivity it is only one of the
11 elements in importance to species and the Shallow Bay
12 area and other parts of the delta farther upstream
13 provide habitat which may not have more food in it
14 but which offers things that certain species are looking
15 for for protecting, for rearing young, etc.

16 A Very definitely, and in
17 turn even the chlorophyll production, or if you will the
18 phytoplankton production in the lakes and ponds in the
19 delta per se, especially the upper delta, are far
20 different than -- I'm guessing but I'm assuming that
21 this is the case in terms of their total productivity
22 being greater.

23 Q And --

24 A But I think you've honed
25 in on the one most important aspect, that there are
26 diversity of habitat and each of those provides a very
27 important element or several elements to the diversity
28 of wildlife found.

29 Q And this area, as I
30 understand, is an important one for species that only

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1 inhabit it for part of their yearly life cycle.

2 A That is correct.

3 Q And although they may go
4 to other areas to do a large part of their feeding, be
5 they whales, for example, they require the Shallow Bay
6 area in numbers and other areas, Liverpool Bay, for
7 example, in order to have their calves for various
8 reasons, one of which may be that there is warmer water
9 there than there is in other parts of the Beaufort Sea.

10 A That is correct.

11 Q And we could define these
12 other importances of this Shallow Bay area as a provision
13 of habitat that is not provided elsewhere in the ecosys-
14 tem inhabited by these various species.

15 A Yes and no, in the sense
16 that that is only one of the concentration areas for
17 whales; but it obviously is one of the important ones
18 in the total estuarine system of the Mackenzie Delta.

19 Q And your point is that that
20 is one of the reasons why this area has attracted a
21 higher concentration of human habitation both in the
22 recent past and in prehistorical past because species
23 congregate here at certain times of the year in the
24 summer season especially.

25 A That is correct, and the
26 same thing then in terms of the staging area for the
27 snow geese in the fall, there's 200-350,000 birds impact-
28 ing on a relatively small area becomes very central
29 then as a potential food source during that portion of
30 the year.

1 THE COMMISSIONER: Just, Dr.
2 Bliss, you said there were about 5,000 whales in the
3 Beaufort Sea so far as one can tell, and that about
4 2,500 of them would come into Shallow Bay to calve?

5 A No, I'm sorry, not into
6 Shallow Bay, but the whole estuarine area there is
7 estimated to have a population that ranges for only the
8 three years of 2,000 to 3,500, even up to nearer 4,000.

9 Q But they would come into
10 the estuary and in particular into Shallow Bay, it being
11 the largest entry, so to speak, into the delta. Are
12 you familiar with Arctic Gas' proposal to build the
13 pipeline from Alaska across Shallow Bay?

14 A Yes.

15 Q No doubt we're coming to
16 this, but could you tell me where that crossing of
17 Shallow Bay is in relation to the penetration of the whales
18 for calving purposes which I think you said was from
19 mid-June to mid-August?

20 A To mid-August, at least
21 they're in those waters at that time. Only in part in
22 that I'm not -- I don't have this down completely in
23 my head, I 'm not sure this map will --

24 Q No, it's not on there.

25 A -- illustrate, it shows
26 the line. Sir, you can see the proposed pipeline
27 route is nearer the outer portion than the inner
28 portion of Shallow Bay and in fact it ~~is~~ assumed again
29 in part because of murky waters and therefore a greater
30 difficulty in actually counting them, we cannot use

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1 the Somerset Island model for this, but certain-
2 ly on the basis of elsewhere as well as the fact that
3 -- I think I'm correct in saying that whales have been
4 found as far upstream as Point Separation so that they
5 do come inland, but the percentage I think no one knows.
6 But I think it is reasonable to assume that whales move
7 throughout this area just as they do in the Kugmallit
8 Bay area here. Both of these are prime areas for calving
9 and summer biological activities of these animals. Does
10 that adequately answer your question?

11 THE COMMISSIONER: Yes. Thank
12 you very much. It helps me to understand, and Mr.
13 Marshall, you'll think I haven't read all the
14 material you filed and you'd be right, I suppose, but
15 the construction across Shallow Bay, is that intended
16 to be summer construction or winter construction?

17 MR. MARSHALL: Summer, I believe,
18 sir.

19 MR. BAYLY: Q Now, Dr. Bliss,
20 you have outlined the fact that Liverpool Bay is another
21 area in which whales congregate to calve, taking advan-
22 tage again of warmer waters in that area.

23 A That is correct.

24 Q Now these waters I take it
25 are ones that come out of the Mackenzie and go along the
26 coast.

27 A Yes

28 Q Now, there are plans in the
29 producer application particular reference to the Parsons
30 Lake proposal, to use Liverpool Bay and the Husky Lakes

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1 as the way of bringing material in to assemble it to
2 construct the project. Now I take it that I am correct
3 in assuming that that material would go through the area
4 that you have outlined as being important for whales.

5 A Yes, although I am beginning
6 to skate on a little bit thinner ice in that I think I
7 am correct in saying that the bulk of the information
8 that I have looked at with regard to whale population
9 focuses more in terms of Shallow Bay area around to
10 Kugmallit and does not really include the Liverpool area.
11 I think that it can be assumed that there is evidence to
12 show that there are whales there, but I cannot really
13 aid you much further in terms of quantification of the
14 number of whales that in fact use that area.

15 MR. BAYLY: I'm thinking Mr.
16 Commissioner that we are going to have some evidence read
17 from either Mr. Slaney or someone on his staff who can
18 go into this in more depth. I'd like to know if I am
19 correct in that assumption?

20 MR. BALLEM: Well, I can
21 only refer you to the materials that have been filed by
22 the Slaney and Associates, the nine volume study, and I
23 must confess that I can't just put my hand on whether
24 they deal in more detail with that particular aspect,
25 but that would represent the type of information that we
26 were planning on making available.

27 MR. BAYLY: We've understood
28 Mr. Commissioner from the applicant Arctic Gas that some
29 more information on whales would be provided, by, I as-
30 sume the Slaney company, perhaps in their evidence when

1 they are dealing with cross delta--

2 THE COMMISSIONER: Well, I think
3 that you can assume from what I have heard from Mr. Ballem
4 today and from the usual thorough presentation that we
5 have come to expect from Mr. Marshall, that you will hear
6 more from someone, be it Mr. Slaney, one of his coll-
7 eague's or someone else about Shallow Bay, but if we don't
8 then we might have to prevail upon Mr. Bliss's good nat-
9 ure and bring him back yet a fourth time.

10 MR. BALLEM: I have been advised
11 Mr. Commissioner that we will be talking about whales,
12 but not necessarily in Liverpool Bay, if that helps.

13 MR. BAYLY: I think we will get
14 back to the subject of whales in Liverpool Bay somehow
15 sir.

16 Q If we can go back, Dr. Bliss,
17 to the discussion we were having on diversity and prod-
18 uctivity, in your opinion, despite the fact that the
19 Delta and Shallow Bay may be less productive in absolute
20 terms of food production, do you feel that because of
21 the species diversity which exists for other reasons in
22 this area that it is an area deserving of environmental
23 protection?

24 A Very definitely. This is an
25 area of prime importance. The evolution of people and
26 their utilization of this area certainly showed this,
27 and I tried to present this morning, although I could
28 have gone into greater detail to show that in fact again
29 because there is a combination of land water systems of
30 rivers as well as lakes, as well as forests, forest tundra

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1 and tundra, that there is a greater diversity of species
2 of plants, of birds, of mammals and fishes then elsewhere
3 at these latitudes. This is true.

4 Q From your later ev-
5 idence when you were talking about the ponds in the delta
6 that receive sediment from upstream, I take it that one
7 of the things that we could use as a distinguishing fea-
8 ture between the delta and Shallow Bay from lakes on the
9 higher Arctic islands is that there is a regenerative pro-
10 cess that takes place that gives advantage to certain
11 species in this area and it happens every year.

12 A This is correct.

13 Q And that is something that
14 doesn't happen in a high Arctic lake.

15 A Very definitely. This is a
16 dynamic system and one of the reasons for its not only
17 diversity but level diversity of species as well as pro-
18 ductivity is this annual nutrient enrichment. This is
19 very central.

20 Q And this may be one of the
21 reasons why this area is able to support from year to
22 year a larger population of animals and therefore people
23 who depend on them than would occur if the same number
24 of animals and people gathered around a large Arctic lake
25 farther to the north.

26 A I think that is correct.

27 Q Now, you showed us a table,
28 the
29 slide number I'm not sure of but, I'll describe it. It's
the table which deals with utilization of whales.

30 A Yes.

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Q And it was the one from which you gave us some forecasts or estimates as to whether the whale population could support the harvest that is presently being taken of the whales in Shallow Bay.

A Now please Mr. Bayly, it's more than just Shallow Bay. It is the whole delta area.

Q Does that include the area up to and including Liverpool Bay or do they not go that far?

A I think that they do not include Liverpool but they certainly include around to Kugmallit Bay.

Q Your table, as I understood it in the brief time that it was up, does not include any forecasts of any industry effect either from this industry or any related one on the ability for the whale population to support harvest at the present rate. Is that correct?

A That is correct. I was merely trying to present the basic biological background.

Q Yes. That is therefore in the system as it exists now.

A Yes. With an overestimate Mr. Bayly in terms of the utilization and an underestimation of production or calving.

Q Yes. And no estimate as I understand, of natural kill.

A That's correct. Loss through disease, what have you. I think it's fair to say that we are only at the beginning of our understand-

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1 ing of the biology of the beluga. It's still not known
2 where they winter. It is not fully known where they
3 mate, so that there are many aspects of this species
4 which are not known and those that are have only really
5 been studied in detail in the last few years. Not only
6 in the delta, but Dr. Sargeant's work in the high Arctic
7 around Somerset Island and the eastern Arctic in Hudson
8 Bay.

THE COMMISSIONER:

9 Q Is it likely that they
10 winter in the Arctic, or is the majority view that they
11 go around and through the Bering Strait and winter in
12 the Pacific?

13 A I think not sir. I think
14 at least the background information that I have read,
15 indicates that they probably over winter off shore of
16 Siberia. They do not go down through the Bering Strait
17 but I may not have all the information in hand that is
18 available.

19 Q But our knowledge of the
20 beluga is really that limited, that no one, that the body
21 of knowledge doesn't allow us to say with any certainty
22 where they do spend the winter.

23 A I think that is correct,
24 but again sir, I have not studied these animals, I have
25 only studied the literature related to these animals.

26 THE COMMISSIONER: Yes I understand

27 MR. BAYLY: Q And would I be
28 correct, Dr. Bliss, in saying that we have no way of
29 telling from the information presently available, what
30 would happen if the whales were precluded from either

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1 using Shallow Bay or Kugmallit Bay or Liverpool Bay, in
2 the numbers that they do for summering and calving.

3 A Yes, I think Mr. Bayly
4 that's very true. One of the things that's certainly is
5 needed are impact studies to try to determine the use,
6 utilization, the implications of this. I would not
7 fault the research that's been done, it merely has not
8 been moved into those aspects.

9 Q And I'm correct
10 am I in saying that whales can easily be frightened out
11 of areas by increased human activity of various kinds,
12 especially when it is related to motorized vehicles,
13 boats or airplanes.

14 A Yes, they can be moved,
15 but what the impact is on a twenty-four hour let alone
16 a weekly or monthly basis, I cannot really hone in on.
17 In other words, I don't know, I'm not sure that there is
18 knowledge available here to say that if the whales are
19 driven out ^{of an area} by one mechanism or another, how long it takes
20 for them to reverse and come back in. Whether it's mea-
21 sured in hours or days or weeks. I would judge that it's
22 measured in hours rather than weeks. But again I am not
23 an expert in this area.

24 MR. BAYLY:Q You would agree
25 with me, though, that the present plans, and you've
26 looked at the plans of the pipeline companies' as well
27 as those of the producers', contemplate at least the
28 possibility that there will be at least increased human
29 activity in Shallow Bay, in Kugmallit Bay and in Liver-
30 pool Bay, perhaps occurring all in the same season.

L. C. Bliss
Cross-Exam by Bayly

1 A That is correct, but I
2 think it is also correct to say that in terms of inten-
3 sive activity were this summer construction , it would
4 be for one summer rather than a number of summers. The
5 impact of that is quite different than the impact of an
6 intensive operation that might run for five or ten years.

7 Q Nonetheless, we don't
8 even know what that impact would be. We can only assume
9 that it would be less.

10 A That's right.

11 Q Let's turn to another
12 subject, Dr. Bliss, in an area which is probably more
13 in your specialty as it deals with trees, and you said
14 on page two of your evidence that spruce are important
15 in the areas both farther north in the delta and Richards
16 Island and Tuk Peninsula and farther south, and yet you
17 didn't elaborate on the reasons for the importance, either
18 to the terrain or to the animals inhabiting it.

19 A I'm sorry sir, did I im-
20 ply that spruce was important on Richards Island? That
21 should be corrected because there are only a couple of
22 small populations of black spruce very locally at Tununuk
23 Point and one or two other places. It is not an import-
24 ant species in the outer delta. This is one of the real
25 distinctions between the southern central delta and the
26 outer delta. The lack of trees.

27 Q Alright. Actually
28 you did not say that it was important. You did show us
29 some slides, I believe of the outer fringes.

30 A Yes it showed the trees did

L. C. Bliss
Cross-Exam by Bayly

1 go down the Holmes Creek essentially to the east channel
2 of the Mackenzie, but that is a very specialized local-
3 ized situation and I include it primarily to show that
4 where you have environments that are locally different,
5 that it does give an opportunity for movement of an im-
6 portant tree species such as that.

7 Q Let's go to the
8 actual sentence. You say that the major points will be
9 vegetation and the importance of white spruce the sedge
10 lands of Ellis and Langley Islands as they relate to fall
11 feeding of waterfowl prior to migration. You do tell us
12 why the sedgeland is important, you don't tell us why
13 the white spruce areas identified are important.

14 A Well I must have erred in
15 that Mr. Bayly because I should not imply at all that
16 white spruce occurs in that outer delta area. It does
17 not.

18 Q All right. It does
19 occur farther upstream.

20 A Yes.

21 Q And, as I understand, if
22 we can turn our minds to some of the plans of the prod-
23 ucer-applicants, there is the possibility referred to, for
24 example in the Taglu volume -- the Taglu gas development
25 volume called "Information in support of land tenure
26 agreement application". I don't know Mr. Commissioner,
27 do you have a copy of this volume? It's a thick green
28 volume. I am referring^{sir} to page 2-54 of that volume at
29 item 2.3.8.14, I think I have left out a decimal point.
30 I'll read that, it's a short item:

L. C. Bliss
Cross-Exam by Bayly

1 "construction of the plant would require approximate-
2 ly fifteen hundred timber piles. Possible sources for
3 this piling might be in the Fort McPherson area or else-
4 where in the Northwest Territories. Piling dimension re-
5 quirements would govern the choice of source."

6 Now as I understand, there is timber in the Fort
7 McPherson area along the Peel River, which would be an
8 appropriate size to supply some of the pilings. Is that
9 your understanding?

10 A This is my understanding
11 and I think you may know that there is a small sawmill
12 at Fort McPherson.

13 Q Yes. I understand that
14 there are also some trees that would be of an appropriate
15 size close to Point Separation.

16 A That is correct.

17 Q Now, we have had some ex-
18 amination of the problems raised by Dr. Gill in the paper
19 in which he suggests that in some of these areas, spruce
20 may not regenerate but we may get the regeneration of other
21 species if a large number of trees are taken from a single
22 area.

23 A Yes that's true. He wrote
24 a paper in the Journal Arctic several years ago I think
25 '73, on this.

26 Q Is that a problem that you
27 would see? That if the trees were harvested in the num-
28 bers suggested by the three producer applicants' that it
29 might be a resource that would not come back at least in
30 appreciable human terms of years?

1 A I'm not satisfied in my
2 own mind that there is enough information to properly
3 judge and evaluate it. I have thought of this very same
4 question myself and although I respect ^{very much} what Dr. Gill has
5 written in this one instance for this one area and I am
6 sure that this is factual. Yet whether there are real
7 limitations for the re-establishment of white spruce in
8 those areas, I think no experiments have been done to
9 show where the seeding in or in fact what it might take
10 assuming that there is a problem ^{really} in re-establishment,
11 what it would take to modify that. Therefore, I feel
12 that it's not really appropriate for me to say, although
13 there is this one research paper which shows this pattern
14 that there are no mechanisms in fact for reseedling and
15 proper establishment and regrowth of white spruce in this
16 area. I think until that research question were asked,
17 it remains an open issue.

18 Q All right. Now, if we were,
19 if I am correct in assuming what you've said, you said
20 there just isn't enough knowledge to know whether what
21 Dr. Gill has said about the east side of the Mackenzie
22 applies to this area of the Peel River.

23 A I'm assuming sir, that it
24 might very well apply, but I'm not assuming that there
25 are no mechanisms to mitigate against this. I'm perfect-
26 ly willing to accept that Dr. Gill is correct, that once
27 you have removed white spruce from these areas, that it
28 may tip the balance in terms of soil temperature condi-
29 tions and the like into the maintenance of shrub tundra
30 rather than the seemingly easily establishment or re-es-

L. C. Bliss
Cross-Exam by Payly

1 establishment of white spruce. That's one situation. It is
2 something else then to determine whether or not white
3 spruce can be seeded back in to these areas.

4 Q Now, in order to find that
5 out you would have to do some research.

6 A That research question has
7 to be asked and answered. I agree that it is an impor-
8 tant point to raise. I just cannot give you the answer
9 because I think there is no basis for it.

10 Q Given the schedule that
11 has been contemplated by the applicants to build these
12 gas plants, would that be enough time to do the research
13 and make the determination of whether trees could be har-
14 vested from pilings prior to the construction of these
15 plants in the areas I have outlined?

16 A It certainly could be
17 worked on. I think maybe the other thing that needs to
18 be mentioned at this point is, that I am sure that they
19 or anyone else would not attempt to denude relatively
20 large areas of trees in the southern portion of the delta
21 for this or any other operation, merely from the
22 fact that there aren't that many large trees probably in
23 that area, so that they are going to have to take their
24 timber from a variety of locations, so that I think it
25 is fair to say that it would not really be a clear cutt-
26 ing operation it might have that great a potential im-
27 pact. In turn, I think it's fair to say that already
28 within that delta system there are substantial land areas
29 that do not have trees that are in shrub vegetation so
30 that per se this may or may not be a bad feature ecolog+

L. C. Bliss
Cross-Exam by Bayly

1 ically.

2 Q Now, if you were asked at
3 this point to recommend to the applicants whether they
4 should take their pilings from this area or whether they
5 should consider taking pilings from farther up river
6 would you be in a position to make a kind of recommenda-
7 tion to them?

8 A I would recommend, that it
9 would be that they consider taking the bulk of their
10 pilings further up river. That they take some from these
11 areas and initiate some research to find out whether in
12 fact that there is a problem or not in re-establishment.
13 I accept the fact there may well be, but let's find out.
14 Until we have the research question asked and answered,
15 it remains in this greyness where no one can really hone
16 in.

17 MR. HOLLINGWORTH: Mr. Bayly,
18 just for clarification, can you explain just for the
19 record what you mean by the applicants in that last ques-
20 tion.

21 MR. BAYLY: A I mean by "the
22 applicants" Mr. Commissioner, the applicants to build
23 the gas plants and the feeder line systems as neither
24 other applicant has said in their application that they
25 would intend to take pilings for any purpose that I am
26 aware of.

27 THE COMMISSIONER: Well, why
28 don't we call Gulf, Shell and Imperial, the producers
29 and call Arctic Gas and Foothills the pipeline compan-
30 ies for the purposes of this phase of the hearing.

L. C. Bliss
Cross-Exam by Bayly

1 MR. BAYLY: I'll try and do
2 that sir.

3 Is that clarif-
4 ication sufficient Mr. Hollingworth?

5 MR. HOLLINGWORTH: Thank you.

6 MR. BAYLY: Q Now I take it,
7 that you would contemplate that the present applications
8 for producer facilities which require certain number of
9 pilings would not be the entire needs of a gas field for
10 pilings but this need would continue as the gas field
11 developed. It may be beyond

12 A Your expertise. Yes,
/I'm sure that's the case,
13 but I can't really answer the question now as to where
14 pilings come from. I'm quite sure they do not come from
15 the delta per se.

16 Q Yes.

17 MR. SCOTT: While we are at it,
18 Mr. Commissioner, I'm advised that Mr. Hollingworth has
19 not told us
/ whether or not his company wishes to take timber for pil-
20 ings. Perhaps he can put this on his list to let us know
21 aboutⁱⁿ the future. We know about Arctic Gas and we know
22 something about the producers.

23 MR. BAYLY: I guess Mr.
24 Hollingworth was just trying to be helpful.

25 Q Dr. Bliss, we have read in
26 the evidence that has been prepared for the presentation
27 of the producers that one of the substances that will be
28 discharged into the atmosphere in small quantities is
29 carbon dioxide.

30 A Yes.

L. C. Bliss
Cross-Exam by Bayly

1 Q Now, as I understand, car-
2 bon dioxide is very useful in the production of green
3 plants?

4 A Yes, that's correct.

5 Q And, in fact, carbon diox-
6 ide is a plant fuel. I take it that it would be possible
7 that this carbon dioxide could be captured rather than
8 released into the atmosphere, that it could be used in a
9 secondary industry to feed plants in green houses for
10 example.

11 A That's not beyond the realm
12 of possibility. I'm not sure it's very realistic but it
13 could be done. Yes. Maybe the heat exhaust though is
14 more important in terms of pumping stations in green
15 houses as the Russians have done. Maybe that's a more
16 important aspect.

17 Q And the Russians have I
18 understand used the heat exhaust to keep the greenhouses
19 warm in the winter.

20 A That's right.

21 Q And have you or anyone else
22 to your knowledge for the producers estimated the potential
23 for greenhouse production of vegetables as a secondary
24 industry related to the gas plants in the Mackenzie Delta?

25 A No sir, I have not, but I
26 have a very vested interest in this area, since we have
27 one of the if not the largest facility, controlled envir-
28 onment facility on our campus in Alberta, and have worked
29 a bit back with the man who aided^{us} in the design of the
30 greenhouses and especially the growth chambers in this

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Cross-Exam by Bayly

1 whole area, but no I have not advised per se or consul-
2 ted with any applicant along these lines. I just have a
3 personal interest in seeing whether this might be done
4 realistically.

5 Q Alright. So it's something
6 that you might recommend even on a personal basis to the
7 applicant if you thought it was feasible.

8 A Yes, I think it is very
9 worth considering.

10 Q Sorry, the producers not the
11 applicants.

12 THE COMMISSIONER: You could ask
13 the two pipeline companies to see if that could be done
14 at the site of the compressor stations. Presumably it's
15 the same principle.

16 MR. MARSHALL: Sir, I think some
17 experimental work has been done at the University of
18 Saskatchewan that Arctic Gas was involved in. I think
19 perhaps Dr. Bliss may have been involved in it as well.

20 DR. BLISS: No sir, I am not
21 aware of that, but that's good.

22 MR. BAYLY: Dr. Bliss, turning
23 to another subject, you gave several examples and showed
24 a number of slides that showed that many of the vegeta-
25 tion differences in an area, depend on very small scale
26 topographic differences, and presumably drainage and
27 active layer differences as well.

28 A That is correct.

29 Q In fact, in some of the
30 areas you showed, it may be only a matter of feet between

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Cross-Exam by Bayly

1 quite dramatic vegetation changes.

2 A Even inches.

3 Q Yes. And, I am assuming
4 that it will be very difficult for the engineering de-
5 signers for the producers to design around some of these
6 situations. They may have to ignore some of these dif-
7 ferences in the building of either plants or gathering
8 systems.

9 A Yes.

10 Q 'Ignore' may be the wrong
11 word. Just because they may have to take into account
12 --

13 A Can't mitigate against.

14 Q Yes.

15 A Sir, if I can I might add
16 that I would think that at that micro scale there are
17 probably better things to concentrate on, though,
18 than trying to mitigate against or to bring back
19 in to perfect balance if that were ever possible the
20 exact kinds of plant communities that were in that spec-
21 ific small area.

22 Q All right, now at some
23 point you or someone will have to recommend to the
24 producers when one of these micro systems becomes suff-
25 iciently macro, that perhaps the feeder line should be
26 located elsewhere or a plant should be re-designed or
27 made to accomodate the topography and the vegetation
28 upon it.

29 A Yes, that's true and I
30 think that maybe the same tools and techniques that were

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Cross-Exam by Bayly

1 used by the Environment Protection Board specifically,
2 Helios Hernandez, in assessing the landscape units and the
3 vegetation types along a pipeline route might be appl-
4 ied here as well to see if in fact any significant per-
5 centage of land form, vegetation type were going to be
6 affected. I certainly can't sit here and estimate that.

7 Q This would take you back
8 to your Environment Protection Board position that a
9 regional plan for a production area would be a very use-
10 ful tool in making some of these decisions.

11 A That's correct.

12 Q That's something we don't
13 have as yet.

14 A We don't have, but I would
15 think that in knowing these areas fairly well both the
16 Taglu area the Yaya area and the Parsons Lake area that
17 at least on the knowledge that I have, I would not anti-
18 cipate that any significant percentage of landscape would
19 be affected in this manner. The units that are there
20 are widely represented are a very large scale and would
21 not so be affected. I think one of the aspects of this
22 relates then back to the Caribou Hills area where there
23 are interesting localized specialized groups of plants
24 as well as in the Campbell Lake area. That's you know,
25 a different scale than we're talking about in these other
26 landscapes, where in fact it is anticipated and known
27 where intensive development activity would take place.

28 Q While we are on the subject
29 then of these significant areas for plant communities
30 that you have described, one of them being the Caribou

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Cross-Exam by Bayly

1 Hills?

2 A Yes.

3 Q Another one which you
4 gave us an example of was the Campbell Hills, and the
5 other one was the Fingers between Husky Lakes
6 and Liverpool Bay.

7 A Yes.

8 Q These are all areas which
9 I understand have been contemplated as I.B.P. sites.

10 A That is correct.

11 Q Now, in your estimation
12 could these areas be set aside and be areas which
13 would exclude the oil and gas industry for the purpose
14 of protecting these plant communities which you say
15 are of great significance?

16 A That's a difficult
17 question, sir, because I think I am correct in saying
18 that one of the concepts that is involved and the
19 philosophy behind I.B.P. sites is not only the absolute
20 protection of plant and animal assemblages, but also
21 sites for research, and that does not necessarily
22 exclude, absolutely exclude some modification of those
23 land surfaces which then could be monitored over time.
24 That is not to imply that an IBP. site should be gone
25 in and scooped out, but it might mean that either the
26 site were enlarged in size, or modified in shape a bit,
27 to add a bit more if one chunk of it had a pipeline
28 that came down across the edge or what have you, but
29 would not necessarily totally exclude manipulatory
30 practices within a small component of that I.B.P. site.

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Cross-Exam by Bayly

1 Q Well, Dr. Bliss, the
2 difficulty I'm having is determining what the criteria
3 would be for deciding whether an individual human
4 activity should be allowed within one of these sites
5 that has been recommended. Can we allow barging but not
6 feeder lines, or can we allow exploration but not gas
7 plants? They would have to be located outside. Can
8 you give us some ideas as to how these decisions
9 would be made so that they could fit into the regional
10 plan that you've said would be a useful tool in this
11 area?

12 A Since I'm more familiar
13 with the Campbell Lake area and the Caribou Hills
14 area I would sooner answer you on the basis of this
15 rather than the Eskimo Fingers Lake area, or Eskimo
16 Fingers area in the Eskimo Lakes which I'm not quite
17 as familiar with, and say that one of the key reasons
18 for setting aside the Campbell Lake and Caribou Hills
19 areas was in terms of the plant assemblages. Those
20 plant assemblages are quite repetitive within those
21 landscapes. It is not an area the size of this room
22 that must be held inviolate or a given species would
23 be eliminated. I believe I'm correct in saying that.
24 So that there is repetitive pattern, especially in the
25 Caribou Hills because of the north and west -- I'm sorry,
26 the south and west facing slopes that these same
27 assemblages are found on exposure after exposure. This
28 is essential, you don't want to move down to the scale
29 level of having only one local population left. I find
30 it difficult, though, at this stage of the game to

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Cross-Exam by Bayly

1 have enough insight or to try to recommend to you whether
2 those areas are of sufficient size to maintain this sort
3 of balance that the people that have recommended that
4 these areas be set aside or not, or in fact how much
5 modification, by what kinds of components of a develop-
6 ment plan might go on within this. This is an area
7 that I must confess I have not given enough thought to
8 to substantly give you, or attempt to give you sort of
9 a finite answer. I can't do it at this point.

10 Q But before any development
11 went into these areas which you feel ought to be set
12 aside, you would want to be able to give me those.

13 A Most assuredly. I think
14 that these areas, if they are set aside, then must
15 be maintained in that status. Any plans for any modifi-
16 cation must become before a group of people that have
17 sufficient knowledge of these areas that they could aid
18 in that decision-making practice.

19 Q Let's expand this a bit
20 more and think not only of protecting areas that are
21 important because of the plants and animals that are
22 on them, but let's turn to the reindeer herd --

23 A Yes.

24 Q You gave some evidence on
25 this morning. Now, you told us where the reindeer herd
26 is generally found.

27 A Yes.

28 Q Where it has wintered,
29 where it generally spends the summer, and you've out-
30 lined some other areas that are potential range that

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Cross-Exam by Bayly

1 was used in the past or at least at the moment is
2 there as possible future range.

3 A Yes.

4 Q Now, I just wondered, it
5 might be useful to have this, that slide on.

6 A That slide on? Surely.

7 Q Would that be possible?

8 A We don't need to dim the
9 lights. That thumb print should go in the upper right-
10 hand corner facing you.

11 Q You've outlined on the
12 slide here summer range 1970, and in this -- and summer
13 range 1960.

14 A Yes.

15 Q I take it summer range
16 1960 continues as potential summer range.

17 A Yes, not only that but if
18 I remember correctly there are around 150 reindeer which
19 have continued to live on the island.

20 Q Yes. Now, in your
21 opinion, can we contemplate the possibility that
22 with the development of the gas fields outlined by
23 the producers that that potential summer range on Rich-
24 ards Island may be lost to the bulk of the herd because
25 of the introduction of feeder lines in association
26 with gas plants, both in these applications and given
27 that we've been told that the gas field evolution in-
28 volves the drilling of more wells and the running of
29 more lines.

30 A No sir, I'm not at all

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1 sure that I would say that it will be lost any more
2 than the fact that the winter range in fact which is
3 here listed as "spring range" was lost around Parsons
4 Lake last winter. I think I'm correct in saying
5 that last winter the reindeer wintered in that area
6 and this was an area of active drilling with lots of
7 plane flights and lots of winter truck activity. Now
8 it may be on a different scale than under production.
9 But the fact remains that the reindeer
10 wintered in that area last year, and I gather are
11 wintering further north, which is not totally outside
12 of the area of human activity this winter.

13 Q Now --

14 A There would be an impact
15 but I am not necessarily the best person to give you
16 the authoritative answer as to what that impact will
17 be.

18 Q All right.

19 A It is also fair to say,
20 sir, that reindeer are a bit different than caribou.
21 They're a domesticated caribou that have evolved over
22 generations in relationship to human herding and
23 management, so that their behavioural pattern and their
24 ease or relative ease of movement in tending to them
25 is a different order of magnitude than when one deals
26 with the Porcupine caribou herd.

27 Q All right. Well, let's
28 -- I think we've heard the differences of caribou
29 and reindeer and how they respond to disturbance at
30 some length, but let's go to your area of particular

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1 expertise, and that is with regard to the things they
2 feed upon.

3 A Yes.

4 Q Now we've been told in
5 this application that at present there is no evidence
6 that there is any sulphur or sulphur compounds found
7 in the gas discovered to date. Now, I'll ask you to
8 accept my hypothesis that there is a possibility that
9 with the development of a gas field there may be found
10 some sulphur compounds in the gas that will be expelled
11 into the atmosphere. Now, as I understand from the
12 evidence of Dr. Lent given last week, sulphur compounds
13 released into the atmosphere may have an adverse effect
14 on the lichens and some of the other plants, but parti-
15 cularly the lichens upon which this reindeer herd depends
16 for a large part of its winter forage.

17 A That is correct, and should
18 that be the case, should a relatively high or high sulphur
19 gas and/or oil be found, then this clearly sends up
20 strong signals for the need for mitigating that environ-
21 mental impact.

22 Q Do you mean mitigating
23 in terms of removal of the sulphur, or --

24 A Removal of the sulphur
25 because there is enough literature in the physiology of
26 lichens to show that they cannot tolerate much in the
27 way of sulphur; and since this is an important area
28 throughout the year, this general area, and since we
29 see that the pattern of winter range does vary from
30 year to year, we cannot easily pick out an area and

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Cross-Exam by Bayly

1 say, "This is where they're going to be at this season,
2 and this is where they're going to be at another
3 season," so clearly mechanisms of sulphur removal would
4 have to take a high priority if one were to maintain
5 range that could support this population.

6 Q And it would be someone
7 like you working for the producers who would have to
8 recommend to them what levels of sulphur compounds
9 are acceptable to be introduced into the atmosphere
10 and still maintain the integrity of the plant communi-
11 ties upon which the reindeer, among other things, depend?

12 A Yes, this is true although
13 there are actually people better capable of making
14 these estimates than I am. There is enough expertise
15 in Canada, though, to do this.

16 Q All right. Maybe I'm wrong
17 in this, Dr. Bliss, but I thought I heard you say when
18 you were describing the slide this morning that what
19 is marked as summer range 1960, you said, was summer
20 range 1950. I take it the slide is correct.

21 A Well, the slide said 1960
22 but in fact it was used in the '50's as well.

23 Q So that should say,
24 "Summer range 1950-1960."

25 A Technically.

26 Q Could we turn to another
27 subject then in which we won't require this slide?
28 That is with regard to a subject you touched on this
29 morning, and that is horsetails, which are referred to
30 in the various parts of the application as equisetum,

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1 which I understand is their Latin name.

2 A Yes.

3 Q Can you outline for us
4 on one of the maps in the front of this room the extent
5 of the zone in which these horsetail are found in the
6 Mackenzie Delta region?

7 A Crudely, at least.

8 Q I don't mean exactly, but
9 just to give us an idea.

10 A That is a difficult map
11 to see --

12 THE COMMISSIONER: Why not
13 use the one over here?

14 MR. BAYLY: Perhaps we could
15 have a light on that, Mr. Commissioner. Would that
16 be possible?

17 THE COMMISSIONER: Well, I'm
18 sure it's possible, if only I knew how to do it.

19 MR. BAYLY: Perhaps Mr. Scott
20 can put up a light for us.

21 A There are several species
22 of horsetail, equisetum involved but I believe I'm
23 correct in saying that biologically in terms of wildlife
24 support the most important one is the one that occurs
25 on the mud flats, and its main area of development
26 is in this north central portion of the delta and on
27 down through the southern portion of the delta, mainly
28 along the lakes, especially those that get either an
29 annual or near annual increment of silt, ^{and nutrients} and on those
30 broad flats that I showed you in the one slide, this

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1 particular species grows very well. It is very
2 important as summer food for muskrats. It is also
3 important food for waterfowl, especially geese. But it
4 so happens that there are relatively few geese that
5 really utilize this area as opposed to the outer
6 delta area. So although again it's important summer
7 food for waterfowl, it specifically is not used as
8 much ^{simply} because there are not that many geese in this
9 area. When we move to the outer delta portion, the
10 treeless area which we can draw a line sort of along in
11 here, there is relatively little in the way of this
12 equisetum that grows anywhere from yea high to yea
13 high.

14 Q Would you indicate for
15 the record, Dr. Bliss, first of all the line you
16 drew on the map?

17 A For the record I think
18 I'm correct in saying would be about 20 miles north
19 of Reindeer Station or depot, pretty well at the
20 northern limit of the forested delta portion. I'm
21 saying that the area to the south is the treed delta,
22 the inner delta, and the outer area, the treeless area
23 is the outer delta.

24 Q And the treeless area ^{communities}
25 is the one that doesn't support significant horsetail

26 A Does not support significant
27 amounts of that species of horsetail. There are other
28 species, arvense and the like, but I think I'm correct
29 in saying that species is not nearly as important a food
30 for wildlife, it has relatively little use. It occurs

L.C. Bliss
Cross-Exam by Bayly

1 ecologically on some of the mud flats out in this
2 area. It actually occurs back in here, but it is not
3 the important species in terms of wildlife food.

4 Q Could you tell us for
5 the record how many inches "yea high" is?

6 A Pardon me, that normally
7 grows to a height of one to two feet above the ground
8 surface.

9 Q All right. Now you've
10 stated that it is important feed for those few geese
11 that are in the inner delta feeding throughout the
12 summer.

13 A Yes.

14 Q Is it also an important
15 feed for ducks?

16 A Yes.

17 Q And there are a larger
18 number of ducks than geese?

19 A A larger number of duck than
20 geese in that area. But probably its greatest use
21 biologically is for muskrat.

22 Q So it's importance in
23 the food web in the inner delta is very great.

24 A Yes, very much so in
25 its dynamic system of annual flooding.

26 Q All right. Now, could we
27 refer to the volume that I referred to before, that is
28 the Taglu gas development volume, at page 3-142? In the
29 second paragraph of that page -- and I'll read this
30 to you, Dr. Bliss -- it says:

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"Not all off-site pipelines would be within perimeter dykes. In the event of escapement of hazardous liquids to channels, some impact on aquatic biota would occur however in channels, volumes of water are high and the dilution effect would be correspondingly high."

Now, nowhere in the producer application or supporting material was I able to find any information as to whether the impacts or potential impacts on the horse-tail had been assessed with regard to the escape of toxic chemicals. Has that been done, to your knowledge, and if so, what are the results?

A Mr. Bayly, to my knowledge this has not been looked into but again I don't purport to have knowledge of all of the literature that may have been developed. But to my knowledge that question has not been asked. There are no data.

Q Now, in the reverse delta pond --

A Yes.

Q -- I take it that if say a spill of, let's use the example of diesel fuel, occurred, that that might be carried down by a spring flood, for example, into some of these ponds. Do you contemplate that as a possibility?

A Not really again, because if my understanding is correct, the bulk of the basin and activity in terms of drilling operation is on out in here, it is not in this inner delta where these horsetail

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1 are important. That's not to say it couldn't happen.

2 Q I understand it's quite
3 possible that if a bad storm occurred, which resulted
4 in a storm surge bringing water inland, that it might
5 well go in the reverse of the usual downstream direc-
6 tion, it might flow south with materials. It's a
7 possibility that this might occur.

8 A It is a possibility.

9 Q Now, if that were to
10 happen, would we be facing a situation in which dilution
11 of these liquids would not occur at a great rate because
12 they had -- these chemicals had lodged themselves in
13 ponds which generally don't have a flow except in the
14 springtime?

15 A That's conceivable, Mr.
16 Bayly, although again I don't -- I'm not sure that I
17 can really aid you greatly in terms of the probability
18 of that happening. I should imagine that if there is
19 enough volume of water movement to have carried diesel
20 fuel into those areas, that the magnitude of this
21 would be sufficient that as the water moved back out,
22 the water level receded, that relatively little would
23 remain. If it were to remain in contact with the
24 vegetation for a relatively short period of time, a
25 few hours, it probably already would have had its effect.
26 It's like a herbicide, if it's going to kill it's going
27 to kill right off, and if it sits there an additional
28 couple of weeks is probably not that important. I say
29 that largely from our research that we did earlier on
30 in relation to spilling oil on tundra vegetation. The impact

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1 was almost immediate.

2 Q Now if this did occur,
3 that there was somehow the release of a toxic chemical
4 that got into one of your reverse delta ponds , as
5 you've described them, in your opinion would that have
6 an effect that might only be of a single season's
7 duration, or would we be looking at a situation that
8 perhaps an entire plant community would be affected
9 for a long period of time?

10 A I think, sir, that in
11 general this would only be the single season, and
12 fortunately wherever there is a predominantly water
13 system the impact is less. Again going back to our
14 earlier work ^{on oil} we found that the recovery rate in wet
15 sedge vegetation, not including horsetail, but if we
16 assume that its response would be somewhat similar,
17 that after three years there was between 50 and 70% re-
18 covery of those same species, as opposed to upland
19 situations of shrub vegetation where after three or
20 four years there was typically only 20 or 30% recovery.
21 So that if this were to happen, it would happening
22 within water systems and the vegetation within water
23 systems would be less impacted than vegetation in
24 upland systems.

25 Q And is that the reason
26 that the experiments that were done in spilling of
27 toxic chemicals by the producers were done in upland
28 situations rather than in wetland situations?

29 A Well, sir, we undertook
30 this research actually without direct funding from the

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Cross-Exam by Bayly

1 sponsor, the industry people at all, other than they
2 provided the oil and some of this was on their land.
3 But this did not take any direction from them with
4 regard to this aspect.

5 Q Would you feel that the
6 horsetail is an important enough element in the eco-
7 systems you have described in the upper delta that it
8 is deserving of experimentation to see what protection
9 it requires?

10 A Sure, I'm not sure that
11 you could determine what protection, it would be a
12 matter of how fast the stuff would regrow from the
13 rhizome stems in the mud mat. You would lose the
14 tops of plants, I can predict what the research will
15 show in terms of loss of that crop of plants that
16 year. But I could not predict how long it would take
17 for recovery. That's the important thing, ecologically,
18 biologically. It is essential to know the immediate
19 impact but the long-term impact is even more important.

20 Q But there is a data
21 gap there with regard to --

22 A There's a data gap there
23 and I think this is worth considering, with the research.
24 It's not a large study but I think it's an important
25 point.

26 MR. BAYLY: Mr. Commissioner,
27 I'm wondering if this would be an appropriate time for
28 coffee? I'd like to have a look at my notes to see
29 where I'm going next.

30 THE COMMISSIONER: Well, I

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1 think it's an appropriate time in view of what you
2 said to take a break, and let's hope there's coffee.

3 MR. BAYLY: All right.

4 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

5 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

6 THE COMMISSIONER: We're ready
7 again, Mr. Bayly, so just carry on.

8 MR. BAYLY: Q Dr. Bliss, I don't
9 think I'll be referring to the map any more, if you
10 would prefer to be sitting down.

11 A I'll go where you wish.

12 Q I may be referring to the
13 map behind you because it's larger, and you referred
14 in your evidence to the Kendall Island Bird Sanctuary
15 and you showed a slide. I wonder if that slide could
16 be projected again? I'm concerned with where the thumb
17 print is on that slide.

18 THE COMMISSIONER: Top right-
19 hand corner facing you.

20 MR. BAYLY: Right.

21 Q That's the one, Dr.
22 Bliss, yes, because I think it's in this --

23 A Did you want that earlier
24 one of the flightways?

25 Q Of the -- say again?

26 A Of the flightway patterns
27 for birds.

28 Q I think this one will be
29 sufficient because I'd like to direct your attention to
30 the remarks you made that the Kendall Island Bird

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Cross-Exam by Bayly

1 Sanctuary, if it were redefined in boundaries today,
2 might well have a different shape.

3 A Yes, and this was to the
4 point that biologically it's now known because of the
5 research that's been done in the last two or three
6 years, that this contiguous area here --

7 Q You're indicating the
8 area to the east of the sanctuary.

9 A -- to the east, the
10 immediate east of the Bird Sanctuary is very important
11 as a feeding-nesting area for swans, ducks and geese,
12 and in turn that this southern portion is less utilized
13 by these species. That being the case, I am merely
14 pointing out to the Commissioner that viewed biologi-
15 cally as what is most important to maintain these
16 populations, it might be worth considering to have
17 that boundary drawn in a different manner.

18 Q Now, if you drew it the
19 way that you were suggesting, would that leave Farewell
20 Camp and I believe it's the M'Clintock facility
21 outside the boundaries of the newly defined sanctuary?

22 A Yes, I expect that is the
23 case, but that is not the motivation.

24 Q Right. Now -- and I
25 understand that there are other facilities located in
26 the sanctuary, Chevron I understand has a drill site
27 within the portion that would remain even in your re-
28 defined sanctuary.

29 A I believe that that's
30 true.

L.C. Bliss
Cross-Exam by Bayly

1 THE COMMISSIONER: Dr. Bliss?

2 A Yes.

3 Q What, if there is explora-
4 tion activity going on within the sanctuary, what does
5 the term "sanctuary" imply in this regard? Does that
6 mean that natives can't take birds, or that nobody can
7 take birds? That is -- I mean white people can't take
8 birds or not even natives can take birds. What does
9 it mean?

10 A I think, sir, that it
11 means that white people cannot, but that does not
12 exclude indigenous people. I think it is also safe
13 to say, though, that they take relatively few from that
14 area simply because it is further from their ^{areas of} habitation
15 and at that time of year they are not directly involved
16 as much in that hunting activity.

17 Q Well, the significance
18 of it being a sanctuary is not perhaps very great then.
19 It's a line on a map, that you want altered.

20 A Well, I'm merely suggest-
21 ing biologically it might be altered. I raise it not that
22 I as an individual feel that it must be, but merely to
23 show to you to utilize the information that we now
24 have biologically to show that our previous decisions
25 were made on one data base, and now there's a better
26 data base and therefore we might wish to re-examine
27 this aspect just as engineer-geophysicists re-examine
28 their seismic data and hone in on those aspects.

29 Q Oh, I understand that.
30 You wanted the boundaries to conform to the biological

L.C. Bliss
Cross-Exam by Bayly

1 realities.

2 A Biological rather than
3 a political, I should say a geographic boundary which is
4 largely on the basis of stream channels, and that was
5 very logical to do. It's much easier to recognize
6 this sort of boundary limitation than the one that
7 may speak more of the organisms contained therein where
8 there may not be any natural geographic limit to that.

9 MR. BAYLY: May I continue,
10 sir?

11 THE COMMISSIONER: Yes. Sorry,
12 I was waiting for you to carry on, but in that interval
13 I thought of another question.

14 MR. BAYLY: Go ahead.

15 THE COMMISSIONER: Q I.B.P.
16 site No. 9, the Caribou Hills site --

17 A Yes?

18 Q -- lying just north of
19 Inuvik, as I recollect the evidence of Dr. Peterson
20 who spoke on behalf of the scientists --

21 A Yes.

22 Q -- who developed the
23 I.B.P. sites, he said that that site is one from
24 which they wished all pipeline and pipeline-related
25 activity excluded.

26 Yes.

27 Q You may already have
28 been asked this, but I'll ask it again. Is that
29 something you would agree with?

30 A I think that's a very

L.C. Bliss
Cross-Exam by Bayly

1 reasonable position to take for that particular
2 area. It is not duplicated elsewhere. I realize,
3 though, that that, sir, is in conflict with regards
4 to the availability of gravel in this area which might
5 be used not only for pipelining activities but also
6 for road construction.

7 THE COMMISSIONER: Carry
8 on.

9 MR. BAYLY: Q Dr. Bliss, when
10 you were giving your evidence about the sanctuary
11 if we can go back to that --

12 A Yes.

13 Q -- you had stated that
14 your opinion was that biologists would agree with the
15 logic of changing the boundaries of that sanctuary for
16 the reasons that you've outlined. And my question is
17 is this in fact a proposal being made by the producers,
18 that you're aware of, or any other biologists that
19 the boundaries of this sanctuary be altered?

20 A No sir, not at all.
21 This is a personal opinion expressed on the
22 basis of reviewing the information in hand and realizing
23 again that this might raise an important point.

24 Q Now, turning to another
25 subject, and again one in which we don't require this
26 slide, you referred to certain figures reflecting the
27 value of the harvesting of certain resources.

28 A Yes.

29 Q And could you identify the
30 source of those figures? I didn't note them.

L.C. Bliss

Cross-Exam by Bayly

1 A Yes, Mr. Bayly. If I
2 remember correctly, a portion of those data came from
3 the Slaney Reports on the delta, and the fur data came
4 from one of the social-environmental program reports.
5 I can tell you in a moment, if you'll permit me to
6 look this up. Environmental social program report
7 No.74-42 by D. Bissett,

8 "Resource harvest-- hunter- trapper in the
9 Mackenzie Valley, 1974."

10 Q Thank you, sir.

11 A So that the data with
12 regard to fur-bearing animals, the monetary value of
13 that came from that source.

14 Q Now, as I understand,
15 again turning to another subject, the drilling operation
16 that was referred to by earlier evidence today involves
17 the use of a large number of chemicals, depending on the
18 conditions encountered, the kinds of sediments that
19 pass through, etc.

20 A Yes.

21 Q And these chemicals,
22 without putting a number in them, number in the hundreds.

23 A That's probably true.

24 Q Now, some of these chemi-
25 cals, I take it, are things that have been the subject
26 of testing to see what their potential effect on northern
27 eco-systems, Arctic eco-systems are, and some are as
28 yet untested. Would that be fair to say?

29 A I think that's true.

30 Q Do you know of your own

1 knowledge whether or not a list exists that you had
2 access to of chemicals that have been tested which are
3 used as drilling mud components?

6 Q So any assessment you
7 made on the potential impacts would be either on general
8 knowledge or --

11 Q You mean of one drilling
12 project?

14 Q And is that in the Macken-
15 zie Delta area?

18 Q All right. Have you got
19 a list of chemicals used there?

20 A No, I don't have a list of
21 the chemicals used there. All I know is that in general
22 the rate of recovery of vegetation following the disper-
23 sal of drilling mud over a piece of landscape.

24 Q All right. You wouldn't
25 know then whether or not mercury was -- or any of its
26 compounds -- were used in drilling mud?

28 Q If it were used in either
29 drilling muds or in any of the other related industrial
30 activities that go with the production of gas or oil,

L.C. Bliss
Cross-Exam by Bayly
Cross-Exam by Scott

1 would you be concerned with its effect on aquatic
2 ecosystems, whales and fish species in particular?

3 A Yes sir, I would; but I
4 would also want to know the perspective of that, the magnitude
5 and where it goes within the system. I do not mean
6 to imply that a very minute amount should not be guarded
7 against, the loss of that into natural systems but the
8 magnitude of the loss and where it goes is also of
9 fundamental importance.

10 Q And would that be something
11 that would be useful to have information on before
12 deciding whether or not it is a potential threat?
13 That is whether --

14 A Yes, we'd have to, we'd
15 have to know the magnitude to put it into perspective.

16 MR. BAYLY: All right. Those are
17 all the questions I have of this witness. Thank you,
18 sir.

19
20 CROSS-EXAMINATION BY MR. SCOTT:

21 Q Dr. Bliss, can you help
22 us by telling us what information, if any, has been
23 garnered about the inter-action between reindeer in
24 the delta and development, particularly for example, what
25 do we know, if anything, about the impacts of such
26 things as drilling and seismic work and winter roads and
27 so forth on reindeer population and herding?

28 A Mr. Scott, I can answer
29 you but only in an ancillary manner in the sense that
30 I have not seen any reports that specifically cover this

L.C. Bliss
Cross-Exam by Scott

1 subject. All I have really are my own knowledge of
2 what goes on. As I believe I mentioned this morning,
3 the reindeer herd over-wintered last year in the Parsons
4 Lake area, an area where there were three to five wells,
5 I think I'm correct in saying, drilled. There were
6 roads, winter roads, snow roads in relation to this
7 as well as airplane flights and helicopter flights in
8 the area. I gather that this was not a significant
9 impact on this population in that they for one reason or
10 another remained in that general area for their over-
11 wintering. Short of having any quantitative data in
12 hand, it would seem to indicate then that at that level
13 of inter-action that this had not created a problem
14 per se, that the animals remained in this area at
15 least with some winter activity of drilling, of explora-
16 tion. Are you asking then in terms of seismic lines
17 per se in the summer?

18 Q I'm really asking in
19 addition to that, what is known about ^{these} inter-actions,
20 either by you as a reader of ^{the} literature or you as an
21 observer of the species?

22 A I think very little. I
23 think this is an area that has not been investigated.

24 Q Is anything known about
25 the sensitivity of reindeer in their calving areas?

26 A I think not, and this
27 is certainly an important aspect.

28 Q Have you any judgment as
29 to the kind of work that might be done to obtain this
30 information?

L.C. Bliss
Cross-Exam by Scott

1 A Well, sir, I'm not a
2 wildlife biologist, but having worked with such people
3 and thought about this for several years I think that
4 one of the key kinds of research, the key questions
5 that really need to be asked and answered can either be
6 done with regard to the reindeer herd or for the Porcupine
7 caribou herd, is what is the impact of airplane flights
8 and other activities in close proximity to calving
9 animals? By that I mean what percentage of cow-calf
10 bonds are actually broken at that time, and therefore
11 what is the loss to the herd of potential calves?
12 This is difficult research data to gather, but I, as
13 a biologist, feel that information of this kind is
14 quite essential if we really are to understand what the
15 impact is during this calving period.

16 Q Do you envisage any con-
17 cern, bearing in mind the plans of the producers and the
18 applicants with respect to the reindeer herd, or is that
19 something on which you simply can't comment?

20 A I can't comment substantively
21 Mr. Scott, because this is outside my area of expertise,
22 other than to say that since there apparently has been
23 no information gathered on this, I think the question
24 at least should be asked: What is the potential impact?
25 I think in part in answer to this, though, one has to
26 keep in mind that domesticated animals such as the
27 reindeer may be able to tolerate and may be able to
28 be conditioned by human being movement as well as their
29 very nature in a somewhat different manner than a
30 wild population of caribou, such as the Porcupine herd.

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Cross-Exam by Scott

1 So that while one could extrapolate from one to the
2 other, it's not a direct relationship always, straight
3 line relationship; but I think that this is an area,
4 sir, that is worthy of consideration.

5 Q Well now, turning to
6 another area in which perhaps you are more directly
7 concerned. We heard in other phases of the Inquiry
8 that certain kinds of vegetation, such as sedges and
9 perhaps other types, have particular importance as forage
10 for geese and other large birds, and are related to
11 particular terrains in the delta. Now you're familiar
12 with that in a general way?

13 A Yes.

14 Q I'd appreciate your comment
15 on the relationship, if any, between these principal
16 areas of important forage and areas of petroleum develop-
17 ment as you understand them, from the producers' material
18 and whatever else you've read.

19 A Yes. I think clearly,
20 Mr. Scott, that this is one of the areas where there is
21 a potential biological impact effect of greater signi-
22 ficance than some of the others, specifically the
23 biologists that have studied this area know that there
24 are roughly 250,000 to 350,000 snow geese that impact
25 in a relatively small area for fall feeding. This is
26 an area where apparently, because of their intensity of
27 grazing, they have not modified the vegetation to any
28 extent. Nevertheless they utilize this year after year,
29 and certainly this is an area where there is going to be
30 development and certainly this is an area therefore that

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Cross-Exam by Scott

1 has to be looked at, I should think, more critically
2 with regard to the long-term impact of fall feeding and
3 human activity than maybe some other components of the
4 biology of this whole delta area.

5 Q Where is that area, Dr.
6 Bliss?

7 A That area includes
8 Ellis Island in, is it Langley? In essence this
9 region in here, Mr. Scott.

10 Q Can you describe "in here"
11 a little more precisely?

12 A Sir, it is to the west
13 of the central channel of the Mackenzie system, which
14 is just to the west of Richards Island. It includes
15 the land areas, the island areas between Richards
16 Island and Shallow Bay on the west. It includes then
17 Ellis Island and Langley. Not all of that landscape, but
18 a considerable portion of it contains sedge vegetation.
19 It's my understanding that the geese feed not only on
20 the underground stems or rhisomes, but also the base
21 of the plants; but their grazing intensity is not so
22 intense but there is recuperative capability,
23 and I think this is again one of the important points,
24 sir, to bring out at this point, that the Mackenzie
25 system is a dynamic system, and because of its annual
26 flooding replenishment, some portions at least of that
27 system can take harder utilization by animals, by people
28 and what have you, than other landscape areas away from
29 it, and this certainly relates back to snow geese.
30 It's known from the literature that areas in Russia

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Cross-exam by Scott

1 -- areas of sedge-moss vegetation -- have been essentially
2 converted to moss vegetation because of over-grazing
3 of the geese, the elimination of all of the food in
4 essence that they normally utilize. The same phenomenon
5 occurs in some of the Arctic Islands, but in this
6 delta area because its dynamics, its productivity and
7 the recovery capability of the vegetation, that kind of
8 impact by wildlife on vegetation does not appear to
9 occur. But that's a somewhat different but related
10 issue in terms of human activity than in the area.

11 Q Well, the snow geese
12 autumn foraging area is outside the Kendall Island
13 Bird Sanctuary.

14 A That is correct.

15 Q And I take it that what
16 you're saying is that a development in or near that
17 area would have to be carefully examined in order that
18 impacts be measured.

19 A Very, very much so,
20 because this is again -- we discussed earlier today
21 the importance in the biological life history of whales,
22 that there are certain aspects of their activity, i.e.
23 calving, and the nursing of young animals, it's very
24 critical and this is a relatively small area. You have
25 now, sir, identified another aspect in terms of the
26 biology of snow geese that is very central where there
27 is a relatively small area utilized each year by this
28 population.

29 Q Well now, Dr. Bliss,
30 we've also heard that -- and you, I think, have just

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Cross-Exam by Scott

1 described in a sense that geese at that location and
2 perhaps others, forage very extensively but yet the
3 plant growth is able to recover in time for it to be
4 foraged or ravaged the succeeding year.

5 A That is correct.

6 Q Are you aware of any
7 impacts of development from the literature or elsewhere
8 that might adversely affect the ability of the plants
9 either at close or at long-range, to make the kind of
10 recovery that is traditional and requisite if snow
11 geese are to feed.

12 A Plants you're talking
13 about now?

14 Q Such as toxic spills,
15 obviously, and so on.

16 A Certainly toxic spills, -
17 Mr. Scott, would have the impact there that they've had
18 elsewhere. The research that we have done and others
19 have done would result possibly in the loss of plant
20 material that year; but again I believe in many of
21 these wetland areas we have numerous aspects of them
22 that work in our favor, in that recovery is more rapid
23 from the basal stem systems of these plants, so that
24 although there might be food loss, that particular
25 fall because of a spill of diesel fuel or some such
26 thing that might impact on this given area, its long-
27 term impact would be less serious biologically, ecolo-
28 gically, than if that same kind of phenomenon occurred
29 in an upland area, for example. This is not to say it
30 wouldn't have an impact that year, but the long-term
implications would be somewhat less.

Q In planning developments for areas such

A I think that's the most critical. I suppose the other critical one, although we're really talking an area that's somewhat outside of what appears to be the pattern of development, is again back to the plants utilized by muskrats, because this is a very important animal and highly utilized in the lower delta area. So that this kind of thing ought to be flagged, but it is already outside what appears to be the main area of development. I suppose the only other area that I can think of relates back to eskers, coarse gravel material and ^{the} kinds of vegetation that occur in these areas. I think from the vegetation point of view there is less probability of eliminating species or plant communities, plant assemblages in these areas. I think that there would be sufficient gravel left no matter what the level of mining were, but what they would be recovering. I suppose related to that, though, is the question of loss of habitat, denning habitat for both barren ground grizzly and foxes. But sir, I cannot think at this moment of any other vegetation type or plant community type that ought to be significantly flagged.

Q Dr. Bliss, you took either credit or responsibility, depending on how it works out, for the re-location of the limits of the Kendall Island

L.C. Bliss
Cross-Exam by Scott

1 Bird Sanctuary. Has anybody else or any ornithologist
2 raised this issue, as far as you know?

3 A I'm not sure that any
4 ornithologists have, but that does not mean that they
5 may not have. Again I'm trying to view this in terms
6 of a biologist having looked at the information and
7 therefore felt that this point might be raised; but
8 I certainly can't sit here and say that there's a ground
9 swell to change the boundary locations of this sanctuary,
10 and that I have been in direct contact with biologists
11 on this.

12 Q I'm simply trying to get
13 precisely that, the extent to which this is a point.
14 Obviously if I were to raise it you would be safe to
15 ignore it, as a legitimate consideration, and look
16 around for a biologist.

17 A The reverse may also be
18 true, sir.

19 Q Well, what I'm asking
20 then next is, have you discussed this with any orni-
21 thologist?

22 A No, I really haven't.

23 MR. SCOTT: I think those are
24 all the questions. Thank you, Dr. Bliss.

25 THE COMMISSIONER: Dr. Bliss,
26 the evidence you gave was that reindeer were introduced
27 into Alaska in the late 19th century. They were brought
28 from Siberia were they not?

29 A Yes.

30 Q Did you hear the evidence

L.C. Bliss
Cross-Exam by Commissioner

1 of Dr. Lent from Alaska who said on Thursday or
2 Friday of last week at the hearings in Yellowknife
3 that the reindeer had not done well in Alaska. He
4 was taking a long view at all that occurred, in 75
5 years.

6 A Yes. Sir, I did not
7 hear that, although I am somewhat aware of his and
8 the views of others, reading the literature. I am also
9 aware of the literature related to the reindeer herd
10 in this immediate area, and it is a colorful history.

11 Q Returning to the whales
12 that spend -- that enter the estuary of the river in
13 summer to calve, you said that the number of whales
14 that the Inuit people take each year is about 150
15 and that 150 are not harvested but lost. Were those
16 150 whales that might be killed in the course of the
17 hunt but not harvested, or would they be whales who die
18 of natural causes, if there is such a thing?

19 A Sir, that was an over-
20 estimate of the number that might be killed but not
21 captured or harvested. I think that the information
22 available indicates that only 30 to 50%, as many are
23 lost in that operation. So really this means a total
24 harvest of about 200 to 250 animals, not the 400 that
25 or the 300 that one would get by taking 100% loss.
26 I was there, sir, trying to maximize the loss component
27 in this to show that even if it were at that level,
28 which it really is not, that it might be that this
29 group of whales are being harvested in quite a reasonable
30 manner, that there is a pretty good balance. I think

L.C. Bliss
Cross-Exam by Commissioner

1 there is a bit of literature on this that shows that
2 if the harvest rate is about 8 or 10% of the total
3 number of animals, that there is a reasonable balance
4 and in fact that appears to be the case here.

5 Q When the whalers entered
6 the Beaufort Sea around the turn of the century, they
7 -- we are told -- were guilty of over-harvesting the
8 bowhead whale to the point of extinction. Does anybody
9 know -- has anybody sought to estimate what the numbers
10 were of bowhead whales in the Beaufort Sea in those
11 days?

12 A There may well be infor-
13 mation on this, although I'm not aware of all of the
14 literature. I believe I am safe in saying that the
15 current estimate of bowhead whales in this portion of
16 the Arctic Sea is around 100 animals, but how that
17 relates, sir, to earlier population estimates I don't
18 know, and of course always in this area, the earlier
19 estimates were less reliable, less easily gathered
20 than they are now so that there is always this
21 question even if you have an estimate of 30 to 50 or
22 100 years ago, the reliability of such data. But I
23 believe I'm correct in saying that there are roughly
24 100 animals now.

25 Q And I take it there's
26 a prohibition on taking them?

27 A That is correct.

28 Q I spent a day or I visited
29 Whitefish Station where people from Inuvik, Inuit
30 people from Inuvik take whales in the summer. What do

L.C. Bliss
Cross-Exam by Commissioner

1 you call -- this is, I suppose, falls in the category
2 of trivia -- but what is the expression you use, a school,
3 a herd, or are those terms applicable?

4 A A pod of whales is a
5 small group, sir. The total, I guess, is a herd,
6 if I remember correctly. This may be a case of the
7 blind leading the blind.

8 THE COMMISSIONER: Very well.
9 Any re-examination?

10 MR. BALLEM: No thank you, Mr.
11 Commissioner.

12 THE COMMISSIONER: Well, thank
13 you very much, Dr. Bliss, and we appreciate your pro-
14 viding the Inquiry with the benefit of your great know-
15 ledge and experience once again, and^{if} there's another
16 occasion for you to return I'm sure it will be equally
17 to our benefit. Thank you very much.

18 (WITNESS ASIDE)

19 THE COMMISSIONER: How's the
20 time, Mr. Scott?

21 MR. BALLEM: It's 4:30, I'm
22 afraid I'm guilty of under-estimating the time that
23 would be required by half an hour, because Dr. Hobart
24 would normally follow in order had some responsi-
25 bilities in Edmonton this morning and I told him I
26 thought it would be quite appropriate for him to come
27 up this evening to go on first thing in the morning.
28 So he is not here. We could, if you wished to do so,
29 put on our first technical panel; but we might in the
30 interests of continuity wish to adjourn and I understand

1 there is another meeting of counsel in any event.

2 THE COMMISSIONER: Well, I
3 think we should adjourn then.

4 Miss Crosby, I was told at
5 the coffee break that people phoning the hall were
6 advised through inadvertence that the hearing this
7 morning was closed to the public but that the afternoon
8 hearing would be open. You might see if you could
9 have an announcement made on the C.B.C. that the
10 hearings this week are being held 9:30 to 12:30 each
11 morning, and 2 to 5 in the afternoon, and that it's
12 a public Inquiry and anyone who lives here -- anybody
13 is entitled to come and listen.

14 Well, we'll carry on at 9:30
15 in the morning.

16 (PROCEEDINGS ADJOURNED TO JANUARY 21, 1976)

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Mackenzie Valley Pipeline
Inquiry

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Vol. 112.

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MACKENZIE VALLEY PIPELINE INQUIRY

Government
Publication

IN THE MATTER OF APPLICATIONS BY EACH OF

(a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A
RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS
CROWN LANDS WITHIN THE YUKON TERRITORY AND
THE NORTHWEST TERRITORIES; and

(b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY
THAT MIGHT BE GRANTED ACROSS CROWN LANDS
WITHIN THE NORTHWEST TERRITORIES,

FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND
ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION,
OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE
PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Inuvik, N.W.T.

January 21, 1976.

PROCEEDINGS AT INQUIRY

Volume 113

CANADIAN ARCTIC
GAS STUDY LTD.

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APPEARANCES:

Mr. Ian G. Scott, Q.C.,
Mr. Stephen T. Goudge,
Mr. Alick Ryder and
Mr. Ian Roland for Mackenzie Valley Pipeline
Inquiry;

Mr. Pierre Genest, Q.C.,
Mr. Jack Marshall, and
Mr. Darryl Carter for Canadian Arctic Gas
Pipeline Limited;
Mr. Reginald Gibbs, Q.C.,
Mr. Alan Hollingworth &
Mr. John W. Lutes, for Foothills Pipe Lines Ltd.;

Mr. Russell Anthony &
Pro. Alastair Lucas for Canadian Arctic Resources
Committee;

Mr. Glen W. Bell and
Mr. Gerry Sutton, for Northwest Territories
Indian Brotherhood, and
Metis Association of the
Northwest Territories;

Mr. John Bayly
or
Miss Leslie Lane for Inuit Tapirisat of Canada,
and The Committee for
Original Peoples Entitle-
ment;

Mr. Ron Veale and
Mr. Allen Lueck for The Council for the Yukon
Indians;

Mr. Carson H. Templeton, for Environment Protection
Board;

Mr. David Reesor for Northwest Territories
Association of Municipal-
ities;

Mr. Murray Sigler for Northwest Territories
Chamber of Commerce.

Mr. John Ballem, Q.C., for Producer Companys;

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C.W. Hobart
In Chief

Inuvik, N.W.T.

January 21, 1976.

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. SCOTT: Mr. Ballem, any time you're ready.

MR. BALLEM: Good morning, Mr. Scott; good morning, Mr. Commissioner. I would like now to call Dr. Charles W. Hobart as our next witness.

CHARLES W. HOBART, sworn:

DIRECT EXAMINATION BY MR. BALLEM:

Q Mr. Hobart, would you tell the Commissioner your full name, occupation and business address, please?

A My name is Charles Warren Hobart. I am a university professor. I teach in the Department of Sociology at the University of Alberta. I am employed as a full professor there.

Q Could you briefly outline your academic and professional qualifications, sir?

A I took my B.A. degree in sociology from the University of Redlands, in Redlands, California; my M.A. degree in sociology from the University of Southern California, and my Ph.D. degree in sociology from Indiana University. After concluding my training I taught at the University of Redlands until I came to the University of Alberta in the fall of 1962. I basically specialized in the sociology of the family and in minority group relations. In the latter context I have conducted research in the provinces relating to Italian immigrants and poverty areas in Alberta, and in the Northwest Territories I have conducted research mostly

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In Chief

Delta

in the Mackenzie/ and on the Arctic Coast, relating to educational arrangements for native children and the consequences of various educational arrangements for the children and their families and factors associated with morbidity and mortality among Inuit children and the impact of oil exploration employment on Inuit workers, their families and the community life in Coppermine and unsatisfaction of delta workers with oil exploration employment.

Q Mr. Commissioner I now propose to file the prepared evidence of Dr. Hobart as an exhibit and Dr. Hobart would you proceed please.

A Mr. Commissioner my responsibility is to give a socio-economic overview of the Mackenzie Delta region. Accordingly I shall be covering some of the same ground as was covered almost a year ago in March by Drs. Helm and Stager before their commission in Yellowknife, and it is inevitable that I repeat some of the same things that were said at that time. For this I beg the commissions indulgence. Millions of words have been spoken before this body in the interim and it is important I think to have a relatively clear image of the history of the relevant developments and of the various aspects of the current situation in the delta /in our minds at this time. I should note that although I have had frequent research involvements in the north since 1962 and specifically in the Mackenzie Delta since the summer of 1963 and I try to keep in touch with the main flow of literature which is relevant to the north, I would consider myself an expert

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1 in only some rather narrow fields. However with this
2 understood I shall review what I consider to be some of
3 the most salient facts with respect to the following
4 areas; the historical background, the cultural, social
5 interactional, demographic, economic and educational
6 characteristics of the Delta area.

7 I cannot refrain from pointing out that the task is
8 in some ways an impossible one: there are five distinct
9 communities in the Delta -- Tuktoyaktuk, Inuvik, Aklavik,
10 Fort McPherson, and Arctic Red River. No two of these
11 communities are really similar. Most of them differ
12 significantly from each other in terms of the ethnicity,
13 size, and religious composition to mention but the most
14 obvious points. To develop an adequate overview would
15 mean to describe each of these five communities in terms
16 of each of the seven areas listed above. I do not have
17 the knowledge, and I suspect that this Commission does
18 not have the patience for such meticulous treatment, but
19 I must emphasize that anything else necessitates
20 recourse to generalizations which, because of the diver-
21 sity among the communities in question, must be at least
22 somewhat imprecise. What I shall do then is to take up
23 each of the six sub-topics in turn, and where particular-
24 ly relevant, comment briefly on ^{the nature of} the disparities between
25 the relevant communities.

26 Historical Background of the
27 Delta. There is, I take it, sir, no need to detail the
28 early written history of the Delta. Suffice it to say
29 that the earliest White contact occurred with the voyage
30 of Alexander Mackenzie down the river which bears his

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1 name, in 1789. The Hudsons Bay Company arrived at the
2 site of what is now Fort McPherson about 1840 and the
3 churches arrived 20 years later. The whalers first
4 began wintering at Herschel Island in 1890, thereby
5 initiating a pattern of trading with, and debauching the
6 Inuit, and to a much lesser extent the Kutchin people, in
7 the Delta region which continued for 15 to 20 years.
8 As a consequence of the deprivations of these and other
9 white contacts particularly in the form of disease
10 epidemics of 1902 and 1905, Crowe reports that "almost
11 all the native Inuit died out". Almost all of the
12 current Inuit residents of the Delta have come in
13 subsequently either from Alaska or from bands living to
14 the east.

15 The Kutchin were more lucky. Although heavily
16 impacted by whites at Herschel Island along the Mackenzie
17 River and in the vicinity of Dawson during the Yukon
18 gold rush following 1896, the Kutchin ^{bands} were able to sur-
19 vive the onslaught of white ^{-carried} diseases which did lay very
20 many low, in frequent epidemics which afflicted the
21 settlements. Trapping was the major means of livelihood
22 from the decline of the gold rush in the early 1900's
23 until increasing wage employment became available during
24 the past decade in hydrocarbon exploration and construct-
25 ion of the Dempster Highway. Trapping income was part-
26 icularly high during the muskrat boom which began to
27 build and 1910, and continued until the price of rat
28 skins fell abruptly about 1930.

29 I want to now say a few words, very briefly, about
30 the history of the five settlements in the Delta. It

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should be borne in mind that with the exception of Inuvik none of the Delta settlements began as settlements. Typically they began as trading posts located for their accessibility to migrant and in some cases distant travelling northern natives. In most cases the trading post location was soon shared with the mission. A few native employees may then have built cabins nearby and in time in a few locations a school, a medical facility and an R.C.M.P. post may have been added. Throughout this time, which depending on the settlement may have lasted 20 to 100 years, there were very few natives who settled down at the post. Rather they visited several times a year to trade, and following the speedy conversion of the populace to Christianity in the years following 1860 for the Dene, and following 1900 for the Inuit, these visits typically were made where possible, to coincide with the holy days of the church.

I should note further that not all of the trading post locations became settlements, nor do the existing settlements necessarily correspond with traditional gathering places. For example, there is now of course no settlement at Kittigazuit although it was the largest gathering place of the Mackenzie Inuit with a population of about 1000 in early contact times, and there was a trading post located briefly there after 1912. Similarly there was a trading post, now abandoned, at Reindeer Station, and outside the Delta the same is true at Herschel Island and on the Anderson River.

Fort McPherson is of course the settlement having the oldest roots, the trading post having been established

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1 there in 1840, with the churches arriving 20 years later
2 as we have noted. The North West Mounted Police estab-
3 lished the first Delta detachment at the fort in 1903 at
4 least in part because it was an alternate route to the
5 Klondike gold fields, no less than 600 people having
6 wintered there in the winter of 1898-99. This community
7 achieved settlement status in 1968, and expects to
8 achieve hamlet status soon. The population in 1974 was
9 about 760 and about 12 percent were non-native.

10 Arctic Red River was established shortly after Fort
11 McPherson in, that should be 1869, as a Roman Catholic
12 offshoot from Ft. Pherson, as the latter became pre-
13 dominantly a Protestant community built on the site of
14 a traditional summer fishing camp. Trading posts
15 followed, the first built in 1901. The economic vis-
16 cissitudes of the people in this area have closely
17 paralleled those the Ft. McPherson people. The population
18 was about 120 in 1974, with only 8 percent non-native.
19 Because of its small population, this is the only
20 community in the Delta which does not have a nursing
21 station although it does have a health station staffed
22 by a lay dispenser.

23 The first trading post in the Aklavik area was
24 established in 1912 and the Anglican Church established
25 itself in 1919. The trading post was moved across the
26 river to the present site in 1921. This settlement
27 soon became the center of trade, government administrat-
28 ion and religious activities for the Delta. Thus it
29 became the centre of dominance for the whole of the
30 western Arctic, boasting churches, trading companies,

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1 governmental agencies, schools, hospitals, air mail
2 service and scheduled steam boats. This important
3 variety of activity together with its location at the
4 interface between the Dene and Inuit territories, and
5 in the heart of ^{one of} the worlds most productive muskrat
6 locations, as early as the 1930's gave the community
7 its distinctive poly-ethnic composition of Dene, Inuit,
8 Metis and whites, Aklavik was the focal point of the
9 frontier culture to be described later. It was superced-
10 ed as the administrative and commercial centre of the
11 Delta following the decision of the Federal government
12 in 1953 to establish a new administrative centre, Inuvik.
13 The expectation was that Aklavik would be depopulated
14 and would cease to exist as a community. However, adopt-
15 ing the motto "never say die" the community fought back,
16 prospered, and achieved settlement status in 1968 and
17 hamlet status in 1974. In, 1974 Aklavik had a population
18 of about 760. The largest ethnic group was the Inuit,
19 about 45 percent, followed by the Metis, about 28 per-
20 cent, the Dene, 20 percent and whites, 8 percent.

21 The first permanent settlement activity at
22 Tuktoyaktuk was the establishment of a trading post
23 there by the Hudson's Bay Company in 1934. There had,
24 of course, been other trading posts in the vicinity:
25 Kittigazuit established in 1912 and Herschel Island
26 established in 1915. Anglican and Catholic missions
27 were established at Tuktoyaktuk in 1937, and Inuit who
28 had been living along the coast in time built log cabins
29 around this nucleus. The building of Inuvik and of the
30 DEW line, both beginning about 1955, provided substantial

employment for a few years, as did the establishment of harbour and dry dock facilities by the Northern Transportation Company. However, by the early 1960's the local economy was at a low ebb as a result of very low returns from trapping, and dependence on welfare was rather widespread. In recent years, hydrocarbon exploration has brought increased employment, especially since the establishment of the Imperial Oil base camp there. During the 1974-75 employment season this settlement showed the largest number of men in such employment, that is hydrocarbon employment, excepting Inuvik, of any in the Delta. In 1974, according to the Government of the territories, the population was about 600. White residents comprised about 6 percent of the population.

As noted earlier, the construction of Inuvik was begun in 1955, and most of the basic facilities were in place and functioning four years later. The result was the transfer of all major commercial and governmental functions to the new town, together with new or expanded research in defence establishments. It is now the base for most companies operating in the western Arctic, including importantly a range of companies variously involved in hydrocarbon exploration. Very rapid rates of expansion in the government and the private sector has meant that the town has rapidly outgrown its projected population of 2000 which was anticipated 20 years ago. Indeed the most recent estimates available suggest a population exceeding twice that projection. In 1974 the estimated population of about 4000 included a slight majority of whites. A majority of the native people were

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Inuit.

It's apparent that the past 50 years, but more particularly the past 20 years, have witnessed the increased sedentarization of the population throughout the Delta. As recently as 20 or 25 years ago most of the population of the Delta would have spent most of the year out of the settlement, in the bush or on the land. Major influences in the reversal of this trend came with the establishment of Federal Day Schools and nursing stations in the late 1950's and early '60's, and more importantly the various housing programs. These provided government and unusually subsidized housing at very modest rentals in place of the variety of huts and cabins which many families had provided for themselves as trading posts and missions were gradually transformed into settlements.

Nevertheless, the Delta people have high rates of physical mobility including much inter-community mobility as well as mobility between the settlement and the bush, the coast, or the tundra. Of course with the establishment of Inuvik and the centering of many facilities there -- medical, educational, transportation, liquor, governmental, etc. - this became one of the most powerful attractions in the area. A study by Heather Black, on file at the University of Alberta, documents the very high levels of travel, and of permanent or semi-permanent removal, between Aklavik and Inuvik. In interviews with members of 103 of the 130 permanent households in Aklavik, she found only five, all elderly people, who had never visited Inuvik and

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only seven had not visited there within the year. More than half had made at least five visits during the preceeding year. Similarly, interviews with members of 96 of the 110 households, which had moved permanently from Aklavik to Inuvik showed that all but thirteen had visited Aklavik during the previous year. Forty-five percent had been gone at least 3 times. In both cases she found that young people make more frequent visits than do older people.

Similar pictures would be found for Fort McPherson, Arctic Red River, and Tuktoyaktuk. The frequencies would probably lower because of the greater distances between these communities and Inuvik, but the rates would be reflective of high rates of social intercourse. The significance of this movement, of course, is that commodities and influences which first find their way into Inuvik very rapidly diffuse to the outlying settlements. The result is that in many respects instead of seeing this region as composed of one cosmopolitan community surrounded by four relatively low contact communities, the whole of the area must be seen as having a considerable amount of cultural homogeneity, much as people do value the differences which do exist.

Cultural Aspects. It is apparent from the foregoing, brief historical discussion that a situation of frequent "cultural contact" with "white culture" has existed for the past 100 years. Substantial contact has existed for the past 75 years, exemplified in the relationships established between whalers and native people at Herschel Island, and the

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1 removal of many Kutchin Dene to Dawson during the
2 Yukon Gold Rush. More recently, numbers of delta
3 people attended residential schools at Fort Providence
4 beginning in 1867, at Shingle Point beginning in 1929,
5 and at Aklavik soon after. A further aspect of
6 this accumulation process was the inter-marriages between
7 white trappers and native women, and to a lesser extent
8 between Dene and Inuit men and women. These inter-
9 marriages made their own significant contributions to
10 a growing cultural melange, which has been apparent
11 in Aklavik, and more recently in Inuvik, since their
12 inception that may be seen in attenuated form in the
13 other delta communities as well. A concise and clear
14 characterization of the main stages of cultural evolu-
15 tion of this area during this period is found in John
16 and Irma Honigman's study of Inuvik, entitled:

17 "Arctic Townsmen,"
18 which was researched in 1967. They differentiate
19 three main cultural periods which they term the forma-
20 tive period, the fluorescent period, and the period
21 of planned development.

22 The Honigmans' view of the
23 fluorescent period -- no, viewed the fluorescent period
24 as a time of establishment and deepening of white
25 cultural influences.

26 THE COMMISSIONER: It says
27 "formative" here. You mean "formative" not "fluorescent"
28 I take it?

29 A No, I mean formative
30 period at the bottom of the page there, that sentence at

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1 the right.

2 Q Right, all right.

3 A It was the time when
4 things were beginning to come together, in other words.
5 It laid the foundations for the florescent period and
6 dates from the time of initial white contacts until
7 about 1865 for the Dene and until 1890 for the Inuit.
8 During this time -- I might mention that because there
9 is a fair amount of basis for perhaps controversy in
10 interpretation of cultural elements particularly, I
11 have leaned on the Honigmans' quoting fairly extensively
12 at times because this work was done before current
13 issues arose, and thus their discussion I think is
14 uncontaminated by current concerns. Thus during this
15 time,

16 "the native people ..."

17 Q You mean uncontaminated
18 by questions relating to land claims or --

19 A Exactly.

20 Q -- development or so forth.

21 A Exactly, yes. These
22 issues had not surfaced at that time in a very prominent
23 form. During this time,

24 "the native people exchanged an economically
25 independent life on the land for a symbiotic
26 relationship with the larger society and accepted
27 many of that society's values. A premium contin-
28 ued to be set on exploiting the land, though the
29 primary object in doing so altered, as did the
30 instruments and techniques of adaptation."

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1 The essential characteristics of this period was the
2 drastic transformation of the social roles of the people
3 in the areas, as independent producers were converted
4 into trapping specialists linked to Canadian or British
5 society for survival. Thus, northern natives essentially
6 developed a symbiotic relationship with the larger
7 society and came to accept many of that society's values.

8 The Honigmans used the name
9 "florescent" for the second period which lasted until
10 the end of World War II because it,

11 "implies a flourishing and growing culture
12 and a population that thrives as it realizes
13 hitherto neglected potentialities."

14 This is the period that Dr. Helm referred to as the
15 "fur and mission era".

16 "Cultural elements continued to flow into the
17 area ever more abundantly. They coalesced, a
18 new culture taking direction from local condi-
19 tions, from leads furnished by new settlers,
20 and from pressures exerted by external agencies,
21 notably traders and missionaries."

22 Economically the culture was based on trapping. The
23 importance of the land and of outdoor living were very
24 prominent themes, and as time went on increasing numbers
25 of non-native trappers adopted this same orientation.
26 But throughout most of the period, this culture was
27 "strongly tinged with sacred values that the
28 churches reinforced."

29 Thus during this period the
30 new way of life based primarily on the fur trade, which

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1 had germinated during the formative period came to
2 full flower. It gave rise to a highly satisfactory, new
3 basis of existence that lasted until it was upset by
4 falling fur prices and rising costs of consumer goods
5 following World War II. This period which evolved out
6 of the upsetting of the subsistence economy equilibrium
7 of precontact times by the fur trade, achieved its own
8 satisfactory equilibrium for a period of some 60 to
9 70 years, thereafter the changed market conditions of
10 the early post-war years destroyed the exchange bases
11 on which the florescent period was predicated.

12 The period must be seen as one
13 of the genuine cultural integration. Quoting Honigmans
14 again:

15 "Cultural uniformity increased as many of the
16 same cultural elements came to span all the
17 ethnic groups. The use of English, which among
18 Eskimos living on Herschel Island had become
19 common by 1912, provided a convenient means of
20 communication."

21 There was extensive population redistribution. The
22 Sigliark, who resided on the coast in the vicinity of
23 the delta, were virtually wiped out by recurrent epidem-
24 ics after the turn of the century, as we've noted.
25 About 1906 many Alaskan Eskimos, many of them from in-
26 land areas, moved to the delta where their descendants
27 yet comprise a substantial proportion of the population.
28 Somewhat later, lesser numbers of Canadian Inuit arrived
29 from coastal areas to the east. Late in florescent times
30 as fur trapping became increasingly profitable, numbers

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1 of Kutchin Dene moved into the vicinity of Aklavik.

2 The Honigmans report that other Athapascan and

3 Algonkian Indians as well came to the delta from Upper

4 Mackenzie River points, including Northern Alberta.

5 The incoming whites included free traders, who moved in

6 when the Hudson's Bay Company lost its monopoly in 1869,

7 prospectors who responded to the Klondike gold rush in

8 1898, and trappers who came with the booming fur

9 prices and improvements in transportation, not to mention

10 the increasing numbers of Anglican and Catholic mission-

11 aries.

12 The residential schools added
13 their own influence through their effect on the children

14 who attended them. About the turn of the century the

15 numbers were very small but the impact was greater.

16 Those who went to school left their homes at the age

17 of four or five years, for unbroken stays of up to ten

18 years at the residential school. Some were sent to Fort

19 Providence where the language of instruction, until

20 1912, was French. Not only did they learn the three R's

21 but they were taught in addition to,

22 "milk cows, cook, wash dishes, plant and

23 harvest potatoes, knit, sew, do beadwork, saw

24 firewood and handle oxen."

25 For many, the florescent
26 period was a period of considerable prosperity. Trapping
27 allowed the native people of the delta to participate
28 intensively in the economy of the larger society and
29 to achieve many of its material values. Around 1937 a
30 missionary wrote that the standard of living of the

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1 Mackenzie Eskimo was probably higher than that of a
4 working class family in Eastern Canada.

3 Another quote from the
4 Honigmans:

5 "In 1912 the increased flow of wealth into the
6 area was conspicuously manifested in two-masted
7 Eskimo schooners (actually yawls) 50 to 60 feet
8 long that had replaced whale boats. In the 1920's
9 Eskimo imported vessels of up to 10 tons and
10 55 feet in length powered by auxiliary engines
11 and costing six to \$8,000. Consumer goods
12 abounded among the Eskimo in the '20's; iron
13 bedsteads, linoleum, canned foods, yeast bread,
14 sewing machines, cameras, hair clippers, thermos
15 bottles and even typewriters. One Eskimo home
16 in Aklavik had electric power. The average
17 winter outfit purchased in 1930 at Aklavik
18 by an Eskimo family going off to trap white
19 fox on Banks Island cost between five and \$6,000."

20 Note that these are 1930, not 1975 dollars.

21 Crowe reports in his "History
22 of the Original Peoples of Northern Canada" that in 1926
23 there were two sloops and no less than 39 schooners
24 operating out of the delta region.

25 While the Kutchin Dene of the
26 area also cashed in on the peak fur prices of this
27 period, they did lack the capital and other resources of
28 the Inuit. Two reasons appear to have been involved:
29 They trapped less intensively and they tended to cling
30 to certain traditional winter caribou hunting patterns.

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The result, according to the Honigmans, is that,

"Eskimo acculturation had taken a route diverging from the Indians in the direction of faster heavier modernization."

The economic consequences of this period, in terms of cash flow, are impressive. Between 1938 and 1943 the delta area annually shipped out more than half a million dollars worth of furs, more than twice as much as the next most productive district in the Northwest Territories. Clearly many of the people of this area have had substantial experience with relative affluence, and as Crowe details with the wide range of consumer goods that such wealth will buy.

The Honigmans found that the most distinguishing characteristic of the culture of the delta was that it was a frontier culture, as they term it. They write that,

"The modern frontier quality" is revealed in its economy based on trapping, hunting, and fishing as well as in its clothing, housing, mode of travel, music, dancing, individualism, drinking and other traits. The formation of this quality owes much to the polarization of delta society that grew steadily sharper in later florescent times as the non-native population increased, particularly in Aklavik."

In contrast with the one stratum, made up chiefly of transient whites, was the other stratum consisted -- which consisted of Indians, Eskimos, Metis, and a few non-natives who deviating from their peers, sought to

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shed a measure of the dominant culture's veneer while identifying with the north. Of this northern culture the Honigmans write, and I quote an extended and very informative passage:

"Over 150 years of fairly intense acculturation and immigration in the Western Arctic have promoted a considerable degree of cultural assimilation on the part of the native people to Euro-Canadian culture, but contact has not acted as a melting pot. A local sub-culture, highly serviceable for adaptation during the heyday of the fur trade, was created during that century and a half of change. It also contained new forms of recreational, artistic, and religious expression, mostly derived from Euro-Canadian models to which the people were exposed. Today in Inuvik many formerly adaptive and expressive components of that culture have been shed or persist only vestigially. Other adaptive and expressive features appropriate to life in a town and to wage-paying labor have been or are being adapted. Frontier culture is practiced in two ways. First it consists in an assortment of outdoor-type activities like trapping, hunting, fishing, bush living, and appropriate clothing and other appurtenances which are put to common use rather than, as in metropolitan culture, being only occasionally employed. The value attached to such activities may easily allow them to get in the way of other obligations, like jobs, school,

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1 and church, to which the people obviously
2 feel much more lightly committed. Second...
3 the frontier culture breaks with the urban,
4 highly organized, and conventional way of life
5 characteristic of the (cosmopolitan). People
6 rely on informal rather than formal organization
7 to get things done, though being individualis-
8 tically inclined they tend to give little thought
9 to group enterprises larger than, for example,
10 a dance and a place to hold it. The norms and
11 values of frontier culture sometimes conflict dir-
12 ectly with those of the dominant culture, though
13 everyone knows the norms of the larger society
14 and even recognizes them as legitimate. Never-
15 theless, some norms like those pertaining to
16 drinking, legal marriage, and values like res-
17 spect for law and the 'police are felt not to be
18 wholly appropriate, perhaps because they are
19 experienced as unduly restrictive. Hence their
20 hold over people is slack. People told that life
21 in the north -- the last frontier as a prominent
22 Eskimo citizen termed it -- not only expands
23 personal freedom but allows a considerable
24 measure of unconventionality."

25 The period of planned
26 development or the modern era, as Dr. Helm terms it, was
27 necessitated by the economic hard times that befell the
28 delta with falling fur and rising consumer goods prices
29 following World War II. It was introduced by governmen-
30 tal initiatives that sought to cope with the increasingly

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1 visible, and serious problems of the north. Inspired
2 by the ideal of bringing standards of living, of educa-
3 tion, and of physical health in the north up to
4 Southern Canadian levels, the government moved in with
5 schools and nursing stations in the late 1950's and with
6 housing programs in the mid-'60's. Earlier, the
7 construction of the DEW Line and the construction of
8 Inuvik provided jobs for many who found trapping in a
9 time of declining fur prices less and less attractive.
10 However, when this flurry of employment activity ceased,
11 many found it difficult to re-assemble the extensive
12 trapping outfit and in any case fur prices were yet low.
13 The increased availability of medical and school facili-
14 ties in the settlements drew more and more people into
15 them. There was a gradual increase in governmental
16 programs and services; transportation and town servicing
17 activities increased. Dr. Helm emphasized the inten-
18 sity of the instructional and regulatory roles that
19 whites increasingly assumed with respect to natives
20 and detailed for this Commission the many new programs
21 that were developed at this time. It was the Northern
22 Service officer who at first personified these new
23 governmental involvements.

24 It has always seemed to me
25 that the Northern Service officer must have appeared to
26 northern natives like a crazy god -- godlike and crazy
27 both in that he could -- in what he could and did
28 accomplish with grant funds obtained from Ottawa, like
29 the community bath and wash house conceived and built
30 under one Northern Service officer and then padlocked

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without ever having been opened for use by his successor because there were no funds to pay an attendant, and he would not open it without one.

However, the increased employment opportunities which these governmental programs incidentally provided by no means counter-balanced the increased availability of labor in the settlements. The various project officers who were sent by the government did their best -- one might say their often "crazy best" -- and to some extent because of this this was a time of inescapable welfarization of many people in the communities. Economic activity at this time, as Dr. Stager noted, was very much in the doldrums. It was only with the onset of exploration activity, which began slowly in the mid-'60's and hit its stride in the early '70's as exploration expenditures increased sixfold in five years, that this period of depression was broken. The snowballing boom of development soon made it possible for any person who wanted wage employment to find it, at very attractive wages, at least during the peak employment seasons of the year.

The most recent aspects of this modernization period are the launching of Anik a couple of years ago, and the impending completion of the Dempster Highway. The former makes available to virtually every home in the delta a window looking onto certain aspects of Southern Canadian society. It is too soon to say yet what the consequences of providing this window will be. Certainly northern natives must see portrayed

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1 there typically in attractive fashion the virtues,
2 the vices, the temptations of Southern Canadian society.
3 Much of what is portrayed there is in conflict with the
4 current indigenous and frontier culture in this area.

5 The completion of the Dempster
6 Highway will make it very easy for a northerner who
7 wants to go south to proceed, hitch-hiking down the
8 highway. It will make it easier yet for southerners
9 who want to come to the delta, and don't have the air
10 fare readily available to come, hitch-hiking in.

11 I think you have to argue
12 that the period of planned development has, in a
13 sense, produced a period of unplanned development. By
14 that I mean that it is and will be simply impossible
15 to control the stuff that comes in through television

16 the people who come in, and who go out and return,
17 on the Dempster Highway. It is impossible to anticipate
18 what the consequences will be, perhaps for many people,
19 of televised inputs, of highway-borne inputs, and of
20 the highway as an escape route. It seems obvious that
21 television, highway, and employment influences must
22 all interact with each other, but with what specific
23 consequences no one can accurately foretell.

24 Demographic aspects. The
25 long cultural section which I have now concluded broadly
26 sets the stage for the four remaining sections with which
27 I want to deal, and they will proceed more rapidly,
28 I think.

29 There is no need here for an
30 elaborate discussion of the changing demographic characteristics of the population of the Mackenzie Delta.

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1 Recourse must be had to population figures for the
2 whole of the Territories. Here the basic facts are
3 quite clear. Going back 50 years, the data available
4 since 1921 clearly indicate in Table 1 -- and we have
5 a projector --

6 MR. BALLEM: These slides
7 or sheets require a very exotic type of projector
8 that may even be obsolete, so we'll see what happens.

9 It's now to be found, I understand, only within the
10 confines of the universities.

11 A That would show up more
12 clearly, I am afraid, if the level of illumination in
13 here were lower.

14 Q Can we turn out the lights?

15 THE COMMISSIONER: I am sure we
16 can.

17 A I'm not sure how well I
18 can read, but I can proceed, hopefully. Going back 50
19 years, the data available since 1921 clearly indicate
20 in Table 1 a rapid increase in the total population
21 of the Territory -- almost a threefold increase between
22 1921 and 1951, and a rapid increase in the native
23 population resulting from the excess births over
24 deaths, despite the high disease rates which persisted
25 to a diminishing extent throughout the 1960's. The
26 Indian population increased by 36% between 1921 and 1961
27 while the Inuit population increased by no less than
28 146%. The "other" population including Metis, and
29 non-status Indians, as well as whites, increased
30 proportionately but slightly between 1921 and 1931,

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1 Q That is a very dim slide.
2 I wonder if you could just possibly just take a ruler
3 and indicate some of the main features of it?

4 A Well, what we're talking
5 about is the increase between 1921 and 1931, and
6 between '31 and '51. These are from a Canadian Census
7 publication. For '31 to '41, incidentally, they do
8 not separate the Indian and Inuit populations. It's
9 been brought out before this Commission that the other
10 categories include Metis and non-status Indians as
11 well as whites.

12 So I was saying the other
13 population increased by over 150% between 1931 and 1941--

14 It's between '31 and '41
15 here. These are the figures we're looking at, the
16 number there and the number here.

17 There's a correction on
18 that. That should be 2,572 and I had that correction
19 in mine and I'm sorry I didn't get it onto the other
20 group. So that to repeat that, the figure under "other"
21 opposite 1941 should read 2,572, two five seven two,
22 instead of 25.7. It's a number instead of a percentage
23 that the typist erroneously picked up there.

24 So the increase no doubt was
25 largely because of the immigration of whites and
26 increased by almost threefold between 1941 and where it
27 was 2,572 and 1951 where it had jumped to almost 10,000,
28 9,765. The increase during the next decade, which
29 coincided with the building of Inuvik was almost as
30 large as the preceding one for the same reason. Just

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what the size of the Metis population was in 1921 and what the nature of the increase in the Metis population has been since that year cannot be discovered from census data. However, there can be no doubting that the overwhelming proportion of the increase in the other component since 1931 has resulted from white immigration to the Territory.

Specifically then, while the Indian population increased from about 3,900 in 1921, to about 5,300 in 1951, to about 7,500 in 1974, the Inuit increased more rapidly yet from about 3,200 -- smaller than the Indian population in 1921 -- to about 8,000 in 1951 and to about 11,600 in 1974, while the "others," predominantly the white component no doubt, increased most rapidly of all.

There appear to be obvious discrepancies in the 1961 figures, which I am not able to explain. These are census data and they change definitions at times and I simply am not able to explain them. The native component is clearly not as large as it should be. However, it's interesting that the "other" component of the population increased rapidly between 1931 and about 1961, but the native component appears to be holding its own since then.

THE COMMISSIONER: Let me stop you there, Dr. Hobart. That "other" component includes white people and Metis and non-status Indians.

A Yes sir.

Q Dr. Helm was unable to break it down and to say that a certain percentage of

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1 the "other" were Metis and non-Status on the one hand,
2 and white on the other hand. You appear to be unable
3 to do the same thing and I can understand why.

4 A Pardon me?

5 Q Well, you appear to be
6 unable to do the same thing, but you do say with a good
7 deal of force that there can be no doubt that the
8 overwhelming proportion of the increase in the other
9 component since 1931 has resulted from white immigration
10 and then the last sentence you -- at any rate --

11 A Permit me to clarify that.
12 That's a judgment based on the assumption that Metis
13 and non-status Indian birth rates would probably approxi-
14 mate those of treaty Indians, and that source of
15 increment does not account for the size of the figures
16 which we're looking at.

17 Q Right, I follow you.

18 A Right. The birth rate
19 statistics in the Territories as a whole demonstrate
20 a cyclic pattern. They show a rise from a low of 20
21 -- that shouldn't be percent -- 20 per 1,000 population
22 in 1932 which increased by 1947 to about 40 per thousand
23 and peaked at almost 50 per thousand during the years
24 1960 to 1964, and 50 per thousand is a very high birth
25 rate, no matter where in the world you look, incidentally.
26 Nowhere in the world does the rate exceed that today,
27 and declined thereafter to 40.1 in 1970 and to 27.8 in
28 1974.

29 Q Are you able to tell us
30 what the comparable rate is for Canada as a whole?

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A The rate for Canada last year was about 18.6. The rate for Canada had declined rapidly during the same period, but by no means as precipitous a rate.

Detailed birth rate statistics by ethnic group are available for the Inuvik zone, which includes the Mackenzie from Fort Franklin north, and Sachs Harbor as well, since 1968. These data show that the live birth rate for Indians to be 43.8 per thousand, for Inuit it was -- that is an error that I hadn't picked up -- 35 point something, I'm sorry I can't fill that in, it was about 35 per thousand; and for others it was 28.8 for 1968. For 1970 the figures were 43.3; 34.1; and 33.8 respectively; and for 1974 showing that drastic drop again, they were 19.5, 19.4 and 45.7 respectively. The remarkably high rate for "others", that is 45.7, is probably to be explained by the fact that this group is heavily white and the white component tends to be heavily composed of young people having the highest reproductive potential. It's a young parent group that characterizes the whites. The comparable rates for the whole of the Territories are quite similar, reflecting a decline from 41.2 live births per thousand for Indians, 40.8 for Inuit, and 32.1 per thousand for others in 1970, to 23.6, 36.8 and 43.3 respectively in 1974.

Thus we must expect some change in the pattern suggested above, that the native component appears to have been holding its own in the immediate future. It was able to hold its own as recently as 1971.

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2 However, between 1970 and 1974 the birth rate for
4 natives in the Inuvik zone fell by one-half, and in the
3 Territories as a whole it fell substantially, parti-
4 cularly for Indians. We must anticipate that the Inuit
5 rates, more resistant because of the isolation of many
6 of the settlements -- that is for the Territories as a
7 whole -- will fall in time as well.

8 A relevant implication of these
9 figures reflecting high birth rates since World War II
10 is that particularly large numbers of native young people
11 have now begun hitting the job market, and they will
12 continue to be entering the job market in large numbers,
13 for at least the next 20 years. If these young people
14 should maintain the high birth rates of their parents,
15 we must anticipate that the labor force will continue
16 to grow at a very rapid rate, but there appears to be
17 clear indications that the native birth rate is now
18 falling, as the rates have in Southern Canada. It is
19 apparent, however, that those entering the labor force in
20 the delta do so in a context where at least half are
21 other ethnic components of the population, mostly
22 white, perhaps.

23 Social aspects. In this
24 section --

25 THE COMMISSIONER: Excuse me,
26 you added a "perhaps" there to that rather dogmatic
27 statement.

28 A Yes, it's an educated
29 judgment again, basically then sitting here reading it
30 that sounded a bit strong to my ears, as well as to your

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ears. Social aspects. In this section we will be briefly concerned with the inter-personal relationships of whites with native people in the Mackenzie Delta. The most relevant concepts with which we are concerned are native autonomy versus submissiveness and dependency on whites, the intrinsic value of native lore, crafts and skills and prejudice and discrimination.

There can be no doubt that generally the post-contact history of native people in the delta has been a history of growing dependency on whites. During the formative period although native people became dependent on traders for continuing supplies of utilitarian (as well as non-utilitarian) trade goods, there were long periods when they were out on the land where they were relatively autonomous. During the florescent period although their dependence on goods from the south increased, very many had the wealth during the golden age of trapping to command these goods in often generous supply. There can be no doubt that while the fur trade remained high -- fur market remained high -- many of the trappers were masters of their fate. The early period of planned development witnessed a rather sharp reversal of this as many became dependent on the government, for welfare money during at least part of the year, for housing fuel oil, water, electricity through subsidized housing programs, and often for jobs as well. The consequence of these governmental programs has undoubtedly been that many people are alive today who would not have survived without them, but the result has been increased

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1 dependency and of course, dependency increases here as
2 in the rest of Canada when employment is not available.

3 Similarly, there has been a
4 steady and increasingly rapid erosion of the value of
5 native lore, crafts and skills. The consequence of early
6 contact with whites was to sustain, if not to increase,
7 the value of the lore and the skills which permitted
8 travel and survival, often in comfort, in the north.
9 Whites were able to travel and to survive only to the
10 extent that they hired natives to look after them, and
11 in time to the extent that they learned from their
12 native tutors. Clearly in many situations whites were
13 able to live in the north only to the extent that they
14 "went native," in many ways, and this often
15 happened most conveniently by marrying a native woman.
16 This state of affairs persisted through the building
17 of the Dew Line in the mid-1950's when it was widely
18 acknowledged that survival away from camp in winter
19 in the event of equipment breakdown was dependent on
20 the lore of a native companion, and such companions were
21 typically provided.

22 Today the state of development
23 of Arctic mechanized technology, increased dependence
24 on air travel, etc., have made the traditional native
25 survival lore and skills increasingly irrelevant to the
26 mainstream of culture, a culture which is rapidly
27 moving away from a frontier culture to a development
28 culture. Today it is far less important to know how to
29 handle dogs than it is to know how to patch up a skidoo
30 that has broken down; less important to know how to build

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1 a snow house than it is to know how to fix a Coleman
2 stove that won't light. Although the ability to read
3 ice and snow conditions accurately is yet important,
4 it is certainly less critically important than it was
5 50 or even 25 years ago when people would travel or
6 hunt under much more marginal conditions than they
7 commonly would today.

The result of this appears to have been a rather massive devaluation of things native, at least on the part of the young people of this area. I remember hearing accounts when I first came up to Inuvik 13 years ago of young men from the Sir Alexander Mackenzie School, who were told to wear native boots (mukluks, they're called) when they went out in mid-winter but who preferred to wear the Jack boots that were popular at that time, with the result that some of them suffered frost-bitten toes. At the same time there were young girls who preferred wearing what they felt to be the more stylish zippered parkas than the more sensible Mother Hubbard parkas in which they could carry their babies with better protection from the winter cold. As a result, I was told some of the babies developed pneumonia. The school system at that time certainly tended, at least indirectly, to foster that attitude, as I will detail below. Donald Claremont was reflecting the same patterns when he wrote in his 1963 report on, "Deviance among Indians and Eskimos in Aklavik, Northwest Territories," that the young people in the area typically exhibited a distaste for work which had traditional aspects or

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1 connotations. Young men often avoided trapping
2 muskrats and young women typically showed no interest
3 in skin sewing, although there were jobs going begging
4 at the Fur Garment Co-Op in Aklavik at the time.

5 The result of this process was,
6 of course, inevitably a loss of respect or worthiness
7 by the native people, both in the eyes of the whites and
8 in their own eyes, I suspect. The building of Inuvik
9 has intensified this process. When whites first came to
10 the Arctic, if they were to survive, much less live in
11 comfort, they had in many ways to adopt the lifestyle
12 of the native people. Thus there was a basic similarity
13 in the everyday living and survival patterns of everyone
14 in the same community. As I heard people in this area
15 say ten years and more ago,

16 "In Aklavik, the honey bucket was the great
17 equalizer."

18 At the risk of over-simplifica-
19 tion, we could characterize the shift from Aklavik to
20 Inuvik as the shift from equalitarianism to discrimina-
21 tion, from attitudes of acceptance to attitudes of
22 prejudice against native people. This is admittedly
23 a somewhat exaggerated statement, and yet I doubt that
24 there are few who are familiar with the situation would
25 dispute me. If in Aklavik the honey bucket was the
26 great equilizer, in Inuvik particularly during the
27 early years, the utilidore was the great discriminator.
28 The planning of Inuvik provided that some would have to
29 continue to carry the honey bucket and who would no
30 longer have to. Thus discrimination was built into the

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1 piling foundations of this community. You could see it
2 from the air before ever setting foot in town, in terms
3 of where the utilidore did run, the white serviced end
4 of town, and where it did not, the native unserviced
5 part of town. Insult was added to injury by what was
6 provided for native people at that time instead of the
7 utilidore, the so-called service centres had both a
8 facility for dumping honey buckets and faucets for draw-
9 ing drinking water, a few feet from each other. Many
10 people said that anything that smelled so bad couldn't
11 possibly provide uncontaminated water, and made their
12 own arrangements to get it elsewhere. That situation
13 has now passed, of course.

14 The situation has now changed
15 of course -- mini-utilidore lines have been extended
16 to many of the houses in this community. But the damage
17 in terms of attitude and expectations as to who is
18 deserving of what, which was done by the original arrange-
19 ments, yet persists and because of the ties and move-
20 ment patterns between this and other delta settlements,
21 there was some infection of these other settlements as
22 well. It was deepened by the common tendency in these
23 other settlements to group the housing of whites in the
24 settlement, and frequently the white run school and
25 nursing station as well, in one end of the community,
26 thus achieving a certain amount of segregation.

27 In its latter years, prior to
28 the establishment of Inuvik, Aklavik became increasingly
29 a centre of government administration. However,
30 initially and I think we may say predominantly, Aklavik

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1 was the trading centre where trappers working Banks
2 Island, the delta, the Anderson River, etc., obtained
3 their outfit and traded in their furs. Inuvik was from
4 the beginning a government administration centre. These
5 differences are very significant. The trader, generally,
6 has a vested interest in the native's success, his
7 competence, his independence. These are the qualities in
8 a trapper which are associated with large fur harvests
9 and which benefit the trader as well as the trapper,
10 keeping the trader in business in the north. The
11 government administrator, particularly people in
12 education, social welfare, rehabilitation and project
13 officers, have inescapably a vested interest in an
14 opposite set of native characteristics -- failure,
15 incompetence, dependency. These are the characteristics
16 which keep the Civil Servant in the north -- a proud,
17 independent, fully self-sufficient people would have very
18 little need for their services. Thus, what one socio-
19 logist has called "the professional deformation"
20 of Civil Servants, leads them to see people and parti-
21 cularly the native people who are their distinctive
22 reason for being in the north, to see them as cases or
23 clients or patients; thus to see them prejudicially in
24 a way that traders typically do not. This it is which
25 explains Parsons finding in a study of the attitudes of
26 whites in Inuvik done for DIAND, that it is the higher
27 status Civil Servants who have been in the north the
28 longest, who perceived native people most prejudicially;
29 who saw them as most childlike and in need of white
30 guidance and supervision. Some of my own research among

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1 white and native manual workers working side by side
2 in the delta these past few years has produced findings
3 complementary to Parsons' findings. These whites,
4 semi-skilled and skilled manual workers, not white collar
5 Civil Servants, tend typically to reflect considerable
6 interest in and appreciation for the situation, the
7 behaviour, and the competence of their native co-workers.
8 Moreover, the more years of experience of this kind
9 that they had had, the greater tended to be their
10 interest and appreciation. Note that these are men who
11 must depend upon and thus perhaps help to elicit compet-
12 ent performance from their fellow workers. They do not
13 have a vested interest in native dependency and incompe-
14 tence. The physical segregation of the Inuvik community,
15 which has led to far less of intimate, informal associa-
16 tion between whites and natives than was and is charac-
17 teristic of community life in Aklavik, has tended to
18 confirm these attitudes in whites, as they share, and
19 reinforce each others' perceptions. Again, in this res-
20 pect as well, Inuvik has served as something of a centre
21 of infection, as the attitudes of whites spread to out-
22 lying settlements, as the self-perceptions of natives
23 are to at least some extent affected by these white
24 attitudes, and as they in turn are passed on to native
25 people in these other settlements.

26 I do not want to be misunder-
27 stood here. Clearly a very important consequence of
28 government programs and of the efforts of Civil Servants
29 has been to save the lives of many people, to improve the
30 material well-being of ^{many} others, and to increase the
knowledge and the marketable skills of yet others.

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1 But the consequence has also been dependency, causing
2 officials to see native people as dependent and needing
3 to be cared for, and no doubt to some extent leading
4 native people to think implicitly, if not explicitly,
5 in the same terms.

6 It is important to emphasize,
7 however, that the pendulum has swung in the other direc-
8 tion in recent years. To my mind, one of the most
9 important and most gratifying consequences of the estab-
10 lishment of the Brotherhood, the Metis Association, the
11 I.T.C. and the COPE organizations, the land claims dis-
12 cussion and litigation, and the hearings of this
13 Commission is the change in native attitudes, the
14 increases in assertiveness of independent and prideful
15 attitudes that are reflected and have been engendered by
16 these developments.

17 Economic aspects. I want to
18 re-emphasize at this point that I am not an economist,
19 and have taken but few courses in economics. Accordingly
20 in this section I shall restrict myself to presenting
21 a little information about historical changes in family
22 income in the delta during the past 15 years or so. I
23 shall not enter into any technicalities of economic
24 analysis. The information that I want to review briefly
25 is vital, however, I believe, in understanding some aspects
26 of the past and the present in the delta.

27 The background to what I must
28 say was necessarily touched on in the historical and
29 cultural discussions. Essentially, I suggested you will
30 recall, that a stable pre-contact situation among

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1 native people was disrupted by the arrival of traders,
2 missionaries and whalers. The consequence of this
3 disruption was a new trapping-trading equilibrium during
4 the florescent period, although there are some differences
5 in this pattern between the Inuit and the Kutchin Dene
6 at this time. This equilibrium was disrupted by the fall
7 in fur prices and rising costs of trade goods in the
8 years following World War II, and by the attractive but
9 brief employment possibilities offered by the building
10 of the Dew Line and of Inuvik. Thereafter, although
11 there was some slow increase in governmental and other
12 service employment, the 1960's were typically a period
13 of hardship and depression in most of the delta, when
14 commonly a majority of the families in outlying
15 settlements were on welfare at least part of the year.
16 These hard times were brought to an end by a general boom
17 in the area which ^{was} triggered in the late '60's by rapid
18 expansion of oil exploration activities.

19 The data available to me to
20 document these trends include average family income
21 figures for the various delta communities for 1971,
22 the analyses of the income from the Canada Manpower
23 study in the Northwest Territories of 1969 and 1970 which
24 were published by C.Y. Kuo, the extrapolations of
25 earnings from the native employment figures published by
26 the Petroleum Industry Committee on employment of
27 northern residents for various northern settlements
28 for the 1971-72 through the 1974-75 employment seasons.

29 A word of clarification on
30 sources of data is in order. The census data available

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2 have several limitations. Income data for the 1961
4 census are unfortunately not helpful since they include
5 only income from wages and salaries, leaving out trapp-
6 ing, self-employment earnings and so on. Further, the
7 census data on tapes available to me are in the form of
8 aggregated data for the various census enumeration areas
9 and do not permit breaking these data down by ethnicity.
10 White data are pooled with native data.

11 This of course is the advantage
12 of Dr. Kuo's analysis of the Manpower Survey income
13 data. Reference has been made on previous occasions
14 sir, before this Commission, to the income data for
15 northerners generated by the Manpower survey conducted
16 in the Northwest Territories in '69-'70. One disadvan-
17 tage with these data, and a very substantial one, is the
18 incompleteness of the survey data for some groups. Dr.
19 Kuo in his analysis of these data reports that survey
20 returns were obtained from 96% of the Inuit, 73% of
21 the Indians, and 62% of the Metis and whites and
22 non-status Indians combined in the Mackenzie District.
23 Moreover, 10% of the survey respondents failed to
24 give income data with the result that the income data
25 are available for only 89% of the Inuit, 59% of the
26 Indians, and 48% of the Metis and whites in this district.

27 THE COMMISSIONER: It says
28 "58." Did you say 58 or 48?

29 A If I said "40", which
30 figure is that? We're talking about the third line
on page 30?

Q Right.

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1 A Yes. If I said other
2 than 59 I mis-spoke. 59 is the correct figure.

3 Q And then 58.

4 A And 58% of the Metis and
5 white, yes.

6 Defining family income to
7 include earned income, including income in kind as from
8 hunting , and government transfer payments, the incomes
9 by ethnic group are found in Table 2, and I guess we
10 need to go back to our magic machine at this point.
11 Let's see, we've got to hit the lights as well. WE'll
12 need to move onto three. The only thing to really
13 emphasize here are the per person average incomes, there
14 are main and medium incomes there as well and that
15 shows that Eskimo per capita income as revealed by this
16 survey were 939 -- \$839, Indian \$666, Metis \$1,146,
17 and white, \$3,544, so there is a fairly close relationship
18 between the income of the various native groups, although
19 the Indian earnings were only slightly more than half as
20 high as the Metis earnings, according to those figures.
21 Now we comment again, though, that the proportion of
22 Metis employment was lowest among the native groups.
23 Let's see, I can't read this at all with all
24 those lights out. I'm sorry, I'm going to have
25 some light.

26 An approximation of native
27 income in the Mackenzie Delta can be made --

28 Q Excuse me, Dr. Hobart.
29 I think we should turn the lights on again because with
30 Dr. Hobart facing that screen he can't be heard.

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A Maybe this one bank will do it. Can you turn off those and leave this one on? That works not too badly.

An approximation of native income in the Mackenzie Delta can be made from data in the Kuo Report. Table 3 presents various income statistics for the five delta communities. May we have Table 3 now, please? Note that these are data from total respondents in each community; thus white respondents are lumped in with native respondents. In terms of the data that he publishes, there is no way of sorting those out. However, white respondents in Arctic Red River, Fort McPherson and Tuktoyaktuk constitute a very small proportion of the total population, thus dependable inferences about native income may be made for these communities.

It is interesting in this context to -- well, the data here showed that the main family income in Aklavik was \$4,300, per capita it was \$890; for Arctic Red River it was \$3,000, per capita \$750; for Fort McPherson it was \$2,500, 2,550, and per capita it was \$654. For Tuktoyaktuk it was \$3,900, per capita it was 738. The Aklavik figures are most suspect because of the largest proportion of white representation in that community. These other three should be relatively representative of native income, I think. Inuvik the figure for a family income is 8,500, 2,274 per capita and that does, of course, reflect a white majority in Inuvik ^{although} /the proportion of white respondents to that survey was the lowest of any group.

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1 It is interesting in this con-
2 text to consider data on employment of delta natives
3 in hydrocarbon exploration during the 1971-72, 1972-73,
4 1973-74, and 1974-75 employment seasons, as compiled by the
5 Petroleum Industry Committee on employment of northern
6 residents. Again it is not possible to differentiate
7 between northern natives and white northern residents.
8 There are, however, strong indications from the nature
9 of the jobs, from knowledge of the communities from
10 which the men were recruited, etc., that the overwhelming
11 proportion of these workers were native.

12 The data in Table 4, may we have
13 Table 4 now, please, the data in Table 4 shows a
14 number of jobs in exploration employment. It shows the
15 number of jobs in exploration employment, the number
16 of man-months worked, and the total and average
17 wages earned by workers from various delta communities
18 for the 1971 through to the 1974-75 employment season.
19 The wage data for 1971-72, '72-73 for Aklavik, Fort
20 McPherson and Tuktoyaktuk were obtained directly from
21 the reports of the Petroleum Industry Committee on
22 employment of northern residents. The other income
23 data were estimated from management employment figures
24 found in the Committee Reports and wage scale figures
25 obtained from the petroleum industry. In other words,
26 they list the number of men who were employed in differ-
27 ent job categories. I obtained the prevailing salary
28 and wage rates for those particular job categories
29 and multiplied it out to obtain the total figures
30 which are presented here. I don't think that there's

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1 anything particular to pull out of that table. The
2 number of men employed in Aklavik has ranged from 52
3 to 114, then down to 56 and 66, over those four
4 seasons, Arctic Red River jumps around a bit.

5 The community which showed the
6 strongest consistent building of employment, that is
7 from lower to higher figures, is Tuktoyaktuk and Inuvik.

8 The data show generally that
9 average earnings are roughly comparable in Aklavik --

10 THE COMMISSIONER: Dr. Hobart,
11 I think this might be a convenient time to stop for
12 a cup of coffee. This is very interesting and helpful
13 but I think it's fairly densely packed and I think we
14 could take a little break for a minute.

15 (QUALIFICATIONS & EVIDENCE OF C.W. HOBART MARKED
16 EXHIBIT 418)

17 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

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1 (PPOCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

2 MR. SCOTT: Mr. Commissioner,
3 I'll bring my whistle this afternoon.

• 4 COMISSIONER: Good thinking.

5 Well let's carry on Dr. Hobarth, whenever you are ready.

6 THE WITNESS: Let's see per-
7 haps we should douse the lights again so that table
8 4 is visible once more. Well, the data in this table
9 show generally that the average earnings are roughly
10 comparable in Aklavik, Fort McPherson and Tuktoyaktuk
11 thus suggesting that ~~what~~ employment has little on the
12 figures from these communities and even for Inuvik
13 the discrepancies are not as large as might have been
14 expected. What we are looking at here, let's take
15 1974-75. The mean income per job in Aklavik was about
16 \$2600, Arctic Red River it was about \$2100, similarly
17 for Fort McPherson, just over \$2100. For Inuvik it
18 was \$3500. For Tuktoyaktuk it was \$2800, about. So
19 there is a fair comparability between the figures for
20 four of the communities excepting Inuvik, there. The
21 larger average income for Inuvik may be explained by
22 1. Some of the workers are white, employed at more
23 skilled jobs and perhaps for longer durations and/or
24 2. Inuvik residents have somewhat less access to fish
25 and game than do those living in the other communities
26 and thus have more motivation to work to the end of
27 the employment season than workers from other settle-
28 ments. Now, those are speculative, obviously. The
29 data show generally that exploration employment has
30 made a substantial input into the income of many

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1 families in the Delta area, specifically, the income
2 of 438 families in the 1974-75 employment season. For
3 the 1971-72 season, these min-family incomes were
4 generally comparable with the mean family incomes re-
5 ported by Dr. Kuo for Fort McPherson, Tuktoyaktuk and
6 Aklavik, exceeding the means reported by Kuo for the
7 first two and significantly below the mean reported for
8 Aklavik. It's recognized that inflation had eroded the
9 value of the dollar between the spring of 1970 and the
10 spring of 1972, however, the manpower survey source
11 of Kuo's data undoubtedly includes a distinctly higher
12 proportion of data for whites than do the exploration
13 employment data for these three communities.

14 THE COMMISSION: Just one
15 thing. On this table that if you take, say the figure
16 for Tuktoyaktuk in 74-75, which is 100 jobs and about
17 200 man-months, just roughing the thing out, does
18 that mean that the average worker in the industry in
19 Tuktoyaktuk in '74-75 worked two months?

20 A Yes, I can
21 elaborate on that briefly in terms of experience that
22 I've had doing researching this area for Gulf, and
23 so my information deals with Gulf employment and it
24 relates to Gulf employees who have been brought in from
25 Coppermine and to Gulf employed for the Delta area
26 as well. Now, the oil companies basically are interes-
27 ted in as little turn-over as possible. There tend to
28 be fairly substantial turn-over rates for many communit-
29 ies. Those turn-over rates in the case of Coppermine
30 have declined somewhat in the three years of experience

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1 with this employment that Coppermine people have had.
2 There are certain communities which have a bit of a
3 reputation of less stability on the job than do others.
4 So, what we're talking about is a situation within the
5 Delta, particularly where wage employment is readily
6 available and workers know it and so they work for a
7 while, and they do something else for a while and then
8 they work for a while. That average of two months is
9 an accurate one in terms of my experience here.

10 THE COMMISSIONER: These
11 incomes per man, these are, I take it, 99% men.

12 A. Yes, right. They reflect
13 what's earned on rotation work where men commonly work
14 for fourteen days in a row and then go home for a week
15 and they come and they work twelve hours
16 a day with time and a half after eight hours, so the
17 amounts earned are pretty substantial as those figures
18 suggest again.

19 Q. So that the average worker
20 in Tuktoyaktuk, last winter in the industry would
21 have put in four of these two week sessions?

22 A. Yes. Relevant also to
23 the economic situation in the Delta community is the
24 occupational structure of this area. Once again, the
25 data easily obtainable from census tapes cannot be
26 broken down by ethnicity thus, impermanent white
27 residents of the north, as well as permanent residents
28 are pooled together with Inuit, Dene and Metis and
29 non-status Indian northerners. Furthermore, there are
30 differences in frequencies of unspecified responses

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and in practises in respect to rounding numbers between the 1961 and 1971 census enumeration area tapes which make the data in Table Five only suggestive. However, in the Table, the table is labelled "Male Experienced Labor Force in Mackenzie Delta by Industry and by Community for 1961 and 1971", and the Industry categories are fishing and trapping. Other extractive industries, manufacturing, construction and trade, utilities service and public administration and unspecified. Now, the most surprising thing about the data in that table I think are the very low frequencies of people in the fishing and trapping categories that are specified. The thing that has to be emphasized, here, I think is that there are a lot of people who have fished and trapped part-time, who are not reflected there, but the fishing and trapping categories for Inuvik for '61 were two per cent of the total group, for 1971 were 1.5 per cent. For Fort McPherson, much more substantial 25 per cent in 1961, but only 6 percent in 1971. Arctic Red River, '61 data are not available, '71 data showed 22 per cent. Tuktoyaktuk showed 17 per cent in '61, 5 per cent in 1971. As I say, I think that these data have to be taken with a distinct grain of salt because if a man is doing something else, he will tend to report his occupation as that something else at the time that he is interviewed for the census enumeration.

Q. You mean that he would be inclined to relegate trapping and fishing^{and} not to mention it as an occupational--is that what you are saying?

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1 A. Yes. My impression in
2 terms of attempting to interpret the data and in terms
3 of things that crop ^{up} in the literature as well is that
4 this is to some extent, residual activity, necessarily
5 so, for two reasons. Because of the cyclic aspects of
6 the available white fox on the one hand and because
7 of fluctuation in the fur market on the other hand,
8 so that it is, to some extent apparently residual
9 activity rather than first priority activity.

10 Q. There's one figure on there
11 than intrigues me. Tuktoyaktuk, 1961, 59 per cent in
12 manufacturing. What was going on there at the time?

13 A. I mentioned that there
14 are changes at times in census definitions and it's
15 possible that that is reflective of the way that the
16 census was handling their data. I can't interpret that.

17 Q. That is post DEW line and
18 pre oil and gas.

19 A. Right. Inuvik was pretty
20 well wrapped up by then, although not completely so,
21 there was a bit of lingering activity I think.

22 Q. So it could, by the way
23 the interviewer asked the questions.

24 A. It's conceivable, yes.
25 Well, to continue, however the data in table five
26 showing the distribution for the Delta communities in
27 1961 and 1971 are revealing. Trappers constitute a
28 very small proportion of the population in 1961 when
29 other sources of employment were very scarce, as well
30 as in 1971 when many more options were available,

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specifically, in Fort McPherson the community with the largest number in this category, trappers comprised 25 per cent of ^{the} labor force in 1961 and 6 per cent in 1971, according to these census figures. For Aklavik, Tuktoyaktuk and Inuvik these percentages are 3 and 17 per cent, 17 and 5 per cent and 2 and 2 per cent, respectively. for the whole of the Delta region, the proportion of the labor force, reporting employment as trappers declined from about 6 per cent in 1961 to about 3 per cent in 1971, according to the census data. The education system. It will be recalled from an earlier section, that a few children from the Delta were taken south to the Roman Catholic residential school at Fort Providence as early as 1870 and the first day school in the Delta was opened at Fort McPherson about 1890. Most education was provided in residential schools which were built at Shingle Point in 1929 and at Aklavik in the 1930's. These were, of course, mission schools. The federal government paid subsidies to these schools but it was not until the 1950's that the federal government became really involved in education with the building of the federal day school at Tuktoyaktuk. Indeed, only in 1959, with the opening of the Sir Alexander Mackenzie School at Inuvik, did the government commit itself to providing education for all children in the Northwest Territories, whose parents might want it, and even then it was not compulsory, since removal of a child from the home, to the residential school, which was the only one available, in many cases, was not mandatory. Much might be said

1 about the education system in the territories and I have
2 done a fair amount of research on it but I shall try
3 to be brief. As contrasted with the educational
4 system instituted by the Danes in Greenland, for
5 example, the system in the territories must be described
6 as promoting cultural replacement. Replacement of the
7 native cultures by the white culture during the 1960's.
8 This orientation had a long tradition in the territories.
9 In many of the residential schools it was common
10 practise never to officially address the child in their
11 native language and even to punish children for speaking
12 their native language, even when they were playing
13 with other children in the school yard. This cultural
14 replacement policy, which was the most flagrant
15 during the 1960's, and has been mitigated since then,
16 is well seen in four aspects of the educational process,
17 the qualifications of the teachers, the language of
18 instruction, the curriculum and the structuring of
19 classroom interaction. Effectively, the only criteria
20 used in determining the qualifications of teachers
21 the north, were southern Canadian criteria, possession
22 of the Teacher's Certificate. The fact that the
23 teacher could not communicate directly with the
24 beginner's class and that none could communicate
25 directly with the parents in many areas, was not seen
26 as significant. There was no attempt at all to produce
27 primary grade teachers, for example, who would have
28 good rapport with their students in their communities
29 by recruiting the best educated local people, providing
30 them with some basic teacher training and having them

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1 teach with a master teacher available for help in
2 planning and trouble shooting. That was not attempted.
3 Similarly, despite the contrary experience and advise
4 of the Danes in Greenland, the Norwegians with the Lapps
5 of Finmark, certain experimental programs in the
6 United States and the carefully researched recommend-
7 ations of UNESCO. That is the United Nations Economic
8 Social and Cultural Organization. The language of
9 instruction in the classroom was always English until
10 the last few years. Similarly, the curriculum in this
11 area, was virtually completely unmodified Alberta
12 curriculum. The structing of the classroom was the
13 same as in the south, typically, sit still, be quiet,
14 work competitively against all others for high marks.
15 I should add, that since about 1970 there have been
16 extensive efforts made to achieve a more synthetic
17 approach and to introduce native content. A number of
18 good northern curriculum materials have been developed.
19 There is greater use of native teacher aids and northern
20 native young people have been trained as teachers under
21 an accelerated program. But the limited effectiveness
22 of these efforts was well reflected in the statements
23 made by Paul Robinson when he resigned about a year and
24 a half ago as Director of Curriculum Development in
25 the Northwest Territories. The result of this approach
26 to education in contrast to that adapted in Greenland
27 for example, was that children who attended school for
28 very many years, particularly residential schools, were
29 effectively unfitted to live out on the land. The same
30 is true, perhaps to a lesser degree, of those who had

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earlier attended the mission residential schools. But when these latter returned home after one or two or four or five years, in the residential school, they speedily to relearn the ways of living on the land, there was no other life available to them. Now, for most children, there is no such comparable guarantee that they will learn the traditional land living skills. The data are not available to permit careful assessment of changes in rates of dropping out of school of age grade retardation and of graduation by native children from the Mackenzie Delta in the years since education first became generally available, about 1959. The Honigmans report that during the 1966-67 school year, 18 per cent of the 384 native ^{children} eligible to be in school in Inuvik were not enrolled. Of those enrolled, 20 per cent were age grade retarded. Forty one per cent of those aged 15 to 20 years had dropped out of school prior to completion of high school, including 24 per cent of the 16 year olds and 52 per cent of the 18 year olds. Perhaps the most satisfactory data relevant to the current educational attainments of natives in the Mackenzie Delta and the speed with which educational attainment is being improved is found in the Canadian census data on the highest grade completed by those no longer in school. As with previously cited census data, we suffered the disadvantage of not being able to filter out those who were white residents at the time the census was taken. In general, however, we can probably assume that those with the lowest attainments will probably be native. The data presented in table 6

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show the highest grade attained for those no longer in school as of 1961 and 1971 for the Delta community. The data in the table show that during this period the proportion of males without schooling, who had not attended school fell from 38 per cent in 1961 to 29 per cent in 1971 in Tuktoyaktuk, from 25 to 12 per cent in Fort McPherson and from 23 % to 17 per cent in Aklavik. The proportions having less than grade 5 education fell from 74 per cent to 41 per cent in Tuktoyaktuk, from 50 to 28 percent in Fort McPherson and from 41 to 31 per cent in Aklavik; and those, I think are the most relevant points made in the data in the table. The effects of the kind of cultural replacement emphasizing approach to education which was particularly evident during the 1960's are well illustrated by the findings from a 1967 survey made by Derek Smith of the employment ^{interests} and occupational aspirations of students enrolled in grades 7 through 12 in schools in the Delta. I should emphasize, I think, that that was a rather select sample. That is, most of the young people had not attained to that range of educational achievement. Data on the five highest and the five lowest ranking occupational preferences of the Delta respondents are found in Table Seven. I'll just briefly go through them. These are categorized by Delta Eskimo, Delta Indian, Delta Metis and Delta Euro-Canadian, the five highest ranking occupational titles for this group of Delta Eskimo young people in grades seven through twelve. The occupations they found most attractive were airplane pilot, radio operator,

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electrician, banker, airline stewardess. The lowest ranking titles they found least attractive, garbage man, bartender, warehouseman, janitor, reindeer herder.

The titles suggested under most liked and least liked by the other two native groups are pretty well comparable, I think, so there is perhaps no need for me to read through those.

THE COMMISSIONER: That was a survey about ten years ago among students from grades seven to twelve with the highest proportion of the respondents being in the lower range of those grades.

A Yes. It would certainly have been -- the highest proportion would have been in grade seven and the proportion in grade twelve would have been quite small. Yes.

COMMISSIONER: It all hangs together except the banker. I don't follow that. It doesn't matter, I guess.

A The data suggests that it's the glamorous and/or skilled jobs that are preferred, should have high prestige in terms of bankers perhaps at least in the local context. Data on the preferred conditions of employment, and this is not on that table, it's another aspect of his study.

THE COMMISSIONER: Another interesting thing. The employment with the government in a prestige situation isn't included there on the left side. There's ^{some} government employment on the right side, but not, certainly, prestige employment. No, carry on, I shouldn't be interrupting you.

A

Generally, it's

the glamorous and/or skilled jobs that are preferred. Data on the preferred conditions of employment show Inuit, Dene and Metis students all most frequently said they would prefer to work in a large northern town, and least frequently, said they would prefer to work on the land. The most preferred type of employer was the large corporation, mentioned by more than half the Delta native children, followed by a small private company, and self-employment a rather close third. That bears out the point you were just making, again, government employment does not figure there. Most of the Delta native respondents said they would prefer to work both indoors and outdoors and of the remainder, more said they would prefer indoor to outdoor work. later replication of this study in other schools in the Northwest Territories outside the Delta, yielded results very similar to those found for the Delta sample. Concluding remarks. The information which I have felt to be most relevant and have tried to present briefly can be summarized as follows: People resident in the Mackenzie Delta region have had a history of frequent contact with Euro-Canadian culture carriers, going back 120 years in the case of those at the south end of the Delta, and 80 years in the case of those at the mouth of the Delta. The result of this increasingly intensive contact, was the flourishing of a frontier culture which involved an assortment of outdoor activities and is contracultural as far as many aspects of urban, middle-class culture are concerned. That is

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it represents values, to some extent in conflict with middle-class values. This culture continues to be the vehicle for traditional native values, lore, and skills. This frontier culture was fully developed by the late twenties and is yet vital, though under increasingly heavy pressure from governmental programs of various kinds and from the development taking place in the delta. Relatively few northerners resided permanently in communities in the delta as recently as 25 or 30 years ago. However, the availability of day schools, nursing stations and, most recently of low cost housing, in the settlements, have inevitably proved increasingly attractive to native people, with the result that the hinterland areas are now virtually completely depopulated of permanent residents. I must hasten to emphasize, however, that much of it is, of course, heavily used by people in a short term or seasonal basis. In terms of demography, the delta has witnessed the diminution of the heavy native majorities residing in the delta, particularly since 1951. This diminution has increased in recent years, primarily, because of the high native birth rates, which have characterized the area. However, since 1970, these birth rates have begun to fall rapidly, thus making it probable in this area, at least, that the native populace will not keep pace with the white populace if the latter continue to increase rapidly. The result of the very high native birth rates which were found for about 20 years, however, is that the native population in this area is a very young population. As of 1971, almost half, 47

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per cent of the native population of the delta was aged zero to 14 years and only 8.5 per cent were aged 50 or more. Thus, in porportion to total size, this popula- tion is inputting large numbers of people into the labor market annually and will continue to do so for at least the next 20 years. In terms of social rela- tions this area has witnessed growing loss of autonomy and increasing dependency on the part of native people, and loss of appreciation of and respect for, much of traditional native lore and skills as these have been rendered technologically obsolescent. Segregation of native people was built into the foundations of Inuvik and there is evidence that longer term white residents in the north, especially civil servants, have been particularly vulnerable to thinking about native people in sterotypic terms, perceiving them as childlike and dependent, as least during the 1960's. 1970 data are not available on this point. Whites who work with native co-workers on the other hand, appear to have a more realistic appreciation of natives. Since contact times, the economy of this area has been given to cyclic swings, but it's particularly noteworthy that many yet alive in the delta today have experienced the affluence characteristic of the pre-great depression years, and of the current exploration boom, and the intervening periods of quiescence and frequent depressi- At the present time, between 300 and 400 or more employees in the delta are directly dependent on explor- ation employment, only a few of whom are whites, I would estimate, and many more, of course, are indirectly

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dependent. Education was not generally available to the children of the delta until a scant 18 years ago, but since that time, almost all delta children have been in school. Up until the last few years the philosophy of the schools was de facto a cultural replacement philosophy with white teachers typically lacking northern experience, teaching the Alberta curriculum to their native pupils, using English as the language of instruction. The effects of this policy have been rather rapid gains in the educational attainments of the native residents of the delta. They have also been to make native young people generally disinterested in more traditional pursuits and sources of livelihood, preferring instead, wage work in settlements typically, of course, in the cleaner, more attractive, more glamorous occupations.

'MR. BALLEM: Dr. Hobart' is prepared now for cross-examination by my friends .

MR. MARSHALL: Thank you, Mr. Commissioner.

CROSS-EXAMINATION BY MR. MARSHALL:

Q Dr. Hobart , what do you consider would be the major socio-economic consequences for the people of the Mackenzie delta in the event all oil and gas exploration activity were to cease?

A Well, as I emphasized in my presentation, I'm not an economist, so I'm not well on top of those data, but I would think that the situation would become similar to what it was toward

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Cross-Exam by Bayly

the end of the 1960's, perhaps worsened by the fact that the labor force has increased in size since then. Young people have entered the labor force in the interim so that from the information that I have, it seems to me that it would be a situation of rather considerable economic depression. Lack of jobs, increasing dependency on welfare and that sort of thing.

MR. MARSHALL: Thank you. I have no further questions, sir.

MR. HOLLINGWORTH: I have no questions of this witness.

CROSS-EXAMINATION BY MR. BAYLY:

Q Dr. Hobart, as I understand when a sociologist addresses himself to a problem or to an area to define what the situation is and to come to some conclusion, that he usually applies some sort of a model or brings some sort of philosophy to bear on what he's doing, and would it be fair to characterize the basic approach that you have taken as one that assumes that an acculturation process is taking place and has been taking place for some period of time?

A Yes. It would.

Q And I understand that that isn't necessarily the only way of looking at, from a sociologist's point of view, what is happening in a given area.

A Let me expand on what I said a moment ago. My interest in the north from the

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outset has been on the consequences of contact between white and native peoples, the impact of white incursions and the thing that got me interested in the first place, was what were the consequences of children coming to the Sam's school here. So that, I don't think I had a preconceived model. My own research in my reading of the literature cannot but impress me with the fact that some rather massive changes have taken place in the lives of people in this area in the course of the last hundred years and we have seen, I think, an accelerating rate of change, and an accelerating impact.

The impending completion of the Dempster highway being but the most recent steps in a process that has gone on and was very apparent of course fifty years ago when people in this area were importing schooners from Seattle and so on.

'THE COMMISSIONER: If you feel you can adopt this, tell me, but I rather got the impression from your paper that you felt the schools introduced in the late fifties and early '60's had been the most significant force on the lives of the people of the delta. First of all, by the physical prescence, having a tendency to bring the people into the settlements, and then by what was taught inside the buildings changing the values and the attitudes of certainly native children, if not their parents as well. Is that a fair comment on your presentation.

A Yes. I think that the nursing stations as well as the schools were responsible for attracting people into communities

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and later, the housing. But I think that in a sense a Rubicon was crossed with the kind of curriculum that was taught in the schools, both in terms of the kind of information that was communicated, but also, I think the symbolic significance was important in that what the school said during the sixties was "white man's learning is a step worth taking people hundreds of miles to learn". The traditional lore and so on has no place in this very important venture.

MR. BAYLY:

Q Given that you didn't come into this region with any pre-conceptions and came to examine a problem, it is fair to say though, that when you were trying to figure out what was happening, you came to the conclusion that, at least you said it appeared to be a process of acculturation.

A Definitely

Q That is a process, as I understand it where what is known as a dominant culture meets another culture and the other culture is changed and absorbed in various ways so that it becomes more like the dominant culture, eventually disappearing if the model is allowed to go to completion.

A I would modify that by saying that in acculturation, well acculturation is a two way street. There's influence of the minority culture, if you will, on the dominant culture as well as vice versa. The garb of many people who came to this hall today, I suppose, is reflective of that in that the -- many people were wearing parkas of

one sort or another. A certain number of people in this area have acquired tastes, perhaps earlier, if not more recently for smoked fish, for smoked muskrat, and so on. It's a two-way street, but the bulk of the impact is certainly along the lines that you suggest, but I would emphasize that it's a give and take process but unequal, definitely an unequal give and take process.

Q All right. I understand that there is another way of looking at the kinds of phenomena that you have described here identifying them as the relationship between a metropolitan and a hinterland culture and you're aware of that model of looking at things.

A Right.

Q But it isn't one that you used?

A I think in this context, they are complimentary. That is, the metropolis - hinterland model says that the economic power of the metropolis succeeds in imposing on the hinterland a certain limited range of opportunities and activities and so on. The consequence of that though, is acculturation. I can't see that these are, in any sense antithetical. They're different. The metropolis-hinterland model is more oriented toward explaining the causes of the kinds of acculturative influences that become established in an area.

Q This situation that you have described would lend itself to interpretations

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that have been made even by participants in this Inquiry that would say that this a colonial model but that might also fit in with your acculturation theory.

A A case can certainly be made that this is, that the situation has operated here in colonial or colony-like metropolis-hinterland ways.

Q Now, if we follow through the model that you have said is in action here, do you feel that it is inevitable that the dominant culture will take over completely, the people of the Mackenzie Delta and that this is a process that will either take a long or a short time depending on what influences the rate, whether it's industrialization or a lack of it.

A It's speculation that you're asking me for and I'll respond with that understood. The real issue, I suppose, is how completely is completely. The climate here is never going to become like the climate of Edmonton, much less Toronto or Vancouver and accordingly, to the extent that climate affects the kinds of activities that are and are not available and, to some extent, employment perhaps and what will you. I think to say that we will eventually see here simply some sort of rubber stamp of southern Canadian culture is unrealistic. I would think also that vestigial aspects of the frontier culture, let's say, will persist. I don't know that I can be much more specific than that and one of the

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most powerful assaults on that I suppose is going to be television which makes available a very attractive kind of educational experience as contrasted with perhaps a somewhat less attractive educational experience that may be available in classrooms and so on. And that the effect of television in particular will be insidious in the sense that people are not aware of what's happening to them as they are exposed and pervasive in the sense that a very small porportion of people in this area will not come under its influence. So massive impact, yes, completely wipe out the existing cultural situation, no, but just beyond that I really cannot be more specific I'm afraid.

Q Well, you must have observed that some of these as happen in the provinces and compared the phenom'nom of television for example, to which native peoples have been exposed in southern Canada for now a period of decades, has that in say the Brantford Ontario area or some the native or predominantly native communities in Alberta had the kind of effect that you're describing or are they still fairly distinct peoples in many ways?

A I think the difference there -- two differences probably -- are that the reserve segregation of Indians in southern Canada makes it a somewhat different scene from the situation here where you don't have native people segregated on reserves. In terms of the last few years also, the rather lush employment opportunities have meant that

people have not been boxed in here to the extent that native people on reserves in southern Canada very frequently are boxed in. That means, for example, that the goodies that television exposes people to have to be seen as unavailable by many native people in southern Canada for perhaps a sizable proportion of native people here, they're not that unavailable. I got a bit of information on Coppermine during the last week or so and I conclude that perhaps Coppermine has the highest proportion of color television sets of any community in Canada if not the world. Now, what I'm saying is that when Coppermine people decide they want colored TV they can go out and buy it. When people on even prosperous reserves in Alberta decide they'd like colored TV, it's not available to them and I think that that makes some difference then.

Q Let's talk about goodies for a moment. You have talked about in your evidence, the externals, the physical things the ski-dos, the schooners, now the television sets. What have these had to do with the core values of the people -- the things that they believe, the way that they behave in their families and among each other. You haven't discussed that and for somebody whose training is in that, I'd like to hear your views on that.

A Again, that sort of thing is much harder to get hard data on and so observations and comments on that are necessarily somewhat more speculative in the sense it's difficult to demonstrate beyond a doubt.

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Q You're not suggesting
that they're any less important?

A No. No, I'm simply
saying that one enters, at that point, an area where one
can prove one's points ^{somewhat} less easily, and perhaps not
prove them at all.

Q Let's have some soft
data then.

A Basically, what has
appeared to happen in a number of communities as wage
income begins to come in more and more, is that
initially, the old patterns of sharing between kin and
between friends to a considerable extent persist, as
far as game is concerned, but money may be defined as
something which -- that is, the white definition of
money, as something I work for and is mine and I don't
have an obligation to share it -- is more common than
is the traditional definition with respect to game
that when I kill an animal, a certain part of this,
various parts of it rightfully belong to various
categories of relatives and so on. Now, my impression
is that there is much more generosity in the giving
of money than may be true of whites in comparable
circumstances. But after a while, the business where
the workers have their money and the hunters share
their game begins to wear pretty thin and what begins
to happen under those circumstances then, is that
game food begins to be sold rather than shared out
the way it was. So that although these changes don't
come as quickly as the adaption of a ski_{doo}, a new

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rifle scope, a new kind of boat or canoe and so on, these value changes do, definitely, come in time. The impact of residential schools, I think, is to heighten that the longer the person is in a residential school, the more he identifies with white role models. Anybody who has gone through high school residential rooms of students finds, well time was - pictures of Elvis Presley and I'm not quite sure who the latest teenage matinee idol is. But these kinds of interest and identification come about and they have a correlative erosive effect I think.

Q Do you imply from this say an evolutionary or a quicker than even evolutionary loss of identity as a peoples?

A I'm not sure what your phrase "evolutionary loss of identity". That there has been a loss of sense of identity that, I'm sure. My concern about the impact of residential school education when I began looking into this ten or more years ago, was that it seemed to me that the kids who went through that schooling system to the extent that they did, wound up sort of dropped between two stools, unable to identify and involve themselves in the more traditional way of life that their parents were living at that time. And, lacking access to -- well, lacking adequate training in terms of skills, among other things for wage employment, but also in a situation where such wage employment were very frequently not available.

Q You suggested though in

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your own evidence that the situation's a bit more complex than that because at the same time that the residential school acculturation process if we can call it that is going on, you identify the growth of native organizations, that, you have said are beginning to allow people to organize their thoughts and become a considerable amount more conscious of what we can call an identity, it may not be the same as the old identity from the periods that you've discussed, but --

A That is a fairly familiar process in terms of minority groups in general. That is a drift away from an ethnic identity. I'm talking about immigrants to Canada, or to North America more broadly. A drift away from an ethnic identity and then a return to it and an attempt to recapture and re-emphasize it. I think the recent historical developments in the Northwest Territories have speeded up and sharpened that process, but the erosion and then an attempt to recoup losses is rather common, I would say.

Q Let's compare it with say the Ukranian community in some of the western provinces. Now there you have a community which is very tight knit in some ways and yet has joined in general North American pursuits in other ways. Now, do you see that as a possibility for this area?

A I'm not sure of what you're asking. Are you saying might I anticipate that the nature of development of identity feelings among native people in this area would proceed in the same way in which the development of identity feelings among

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Ukranians in southern Canada has proceeded?

Q It may not proceed in the same way historically, but do you see it consolidating a sense of identity that is likely or unlikely to be eroded by industrialization of this area?

A There has unquestionably been a very sizable consolidation of identity feelings and related concerns in a sense during the past, oh, four to five years perhaps -- three years at least and more. That answers your question, does it not?

Q Yes.

A That I did elude to earlier.

Q Yes, all right.

A I might just add to that that I think that kind of process is very much to the advantage of Canada as a whole and I think it's very much -- obviously very much to the advantage of native people.

THE COMMISSIONER: Sorry, excuse me just -- let me just -- I fell off on the last turn I think. What process is that?

A The process of stronger and more -- stronger crystallization of identity feeling and awareness of issues which native people feel affect them and so on. But primarily here we were talking about identity feelings and the -- I think there's been a coalescing of feelings and sense distinctive peoplehood in a sense.

Q In recent years?

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A Within just the last few years.

Q Yes. I think we have seen in this inquiry that occurring from month to month. But let me -- Mr. Bayly mentioned Ukranian people who come here and probably every white person in this room is -- well, undoubtedly the descendent of someone who came from Europe, but for people who come from the Ukraine, or came from the Ukraine, they were not coming from hunting and trapping economy. They came with the expectation of adopting in very large measure the values and the aspirations of the dominant culture that they've sought to adhere to. They were leaving, travelling thousands of miles just to join up, so to speak and their skin color was no doubt for all practical purposes, the same as the majority in the place they were going to. I ask you this because it has seemed to me that to compare the situation of the native people to immigrants from Ireland and Italy and so forth and so on, is not getting us very far in trying to determine what has occurred here in the north and to try to see what may occur, because of course, the mandate of this Inquiry is to say to the Federal Government "If the gas pipeline is built, followed an oil pipeline, a corridor, then this is what the impact will be on the people here, and I just ask your comment on what I've said -- are we getting very far to -- I'm not blaming Mr. Bayly for this, I certainly want you to proceed with this line of questioning because I know it's been

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well thought out in advance, but it's just my thought that those analogies may not get us very far. Do you have any comment on that.

A Yes. I didn't follow the relevance of Mr. Bayly's allusion to Ukrainians for two reasons. Primarily, the one was that Ukrainians came with a very heightened sense of peoplehood because they'd been fighting for an independent Ukraine for about a thousand years and that accounts for -- I've done some work on Ukrainians so I know a bit about it-- and that accounts for the strength of their identity emphasis as contrasted with some other people. In the case of -- well, there's a bit of parallel in that the Ukrainians experienced pretty massive disparagement -- garlic snappers and men in sheepskin clothing and people with unpronounceable names and so on, on the part of the Anglo-Canadians who had preceded them, but they came out from under that pretty quickly and they were pretty well equipped to come out from under it in terms of the wide open land of opportunity that they were moving to -- they were well prepared to work twelve hours a day to get ahead and that sort of thing. In the case of native people, I think the disparagement that they have experienced, more subtly as well as less subtly has been more massive in its cumulative impact and so the coming out from under that is that much more important.

THE COMMISSIONER: Another difference that has occurred to me. We're sitting in this room today examining the situation of the native

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people almost as if we were clinicians of some kind and that's the way we examine what we conceive to be problems. One thing this Inquiry has done is to go into the villages where the native people live and to see how they feel, what they want to say about this so that we are not, so to speak, conducting this Inquiry in the classroom. I don't say that disparagingly -- I benefitted greatly from everything you've said as have all of the others here, but for instance we held a hearing in Fort McPherson last summer that lasted three or four days. About eighty people must have spoken, half of them at least spoke in Loucheux and many of them, younger people who obviously spoke -- who could speak English -- spoke in Loucheux for reasons that that may not have pertained in the sixties. They might have felt then that they had to speak English, that they ought to. But we -- you have recited this history of well meaning people doing something that had it occurred somewhere else in the world, we might have been -- we might have thought that it was wrong. The disparagement of the native language, the diminution in their own eyes of their people and their values. The reaction that you saw at Fort McPherson was that people said, to me, this is all in the public record, having taken our language, having sought to diminish our values, having in a sense taken away our livelihood, you now say to us, the only opportunities that are going to be available to you are those that we decide to offer to you. The oil and gas industry being the principle economic opportunity we're offering to them

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now. That's the -- that seems to -- seems for reasons that it would be hard not to accept, that has bred a sense of frustration -- almost of well, as you know it has gone farther than that.

I only remind you of that because we're -- Mr. Bayly said to you a minute ago "Well we've seen this process occurring, now is it inevitable it will just keep on going?", and that's where these people, when they speak themselves, have -- they can see it occurring too, and their reaction is a very pronounced one. Well, if you wish to comment on that, fine, if you don't, don't feel that you have to. And I found what you had to say very interesting and very helpful.

A No particular comment occurs to me. I suppose the thing I'm personally in a sense impressed and oppressed by, is the kind of, as you picked up, educational impact we have had on people and the age structure of the area. That is that we're looking at a very young population and those are aspects of the current situation that I think it's important to attend to.

THE COMMISSIONER: I think that they, without the benefit of your knowledge and my less limited -- less -- my more limited knowledge, they're very much aware of those two things, just as acutely aware of them as you are and I am. Well, carry on Mr. Bayly, I'm sorry to interrupt your cross-examination with these musings. What time is it by the way.

MR. BAYLY: Sir -- quarter past

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twelve sir.

THE COMMISSIONER: Well you carry on for another fifteen minutes and I'll keep my mouth shut.

Q Can we follow on this line somewhat more, Dr. Hobart. You've talked about coming out from under, in response^{to} the Commissioner's questions. Are you suggesting that the way^t in which people can come out from under is by taking jobs in the oil and gas industry and whatever else development follows? That appears to be a theme of your paper.

A I don't think I suggested that at all. Let's see, if I use the phrase "coming out from under", what I meant was regaining a sense of peoplehood and a sense of ability to influence events which are going to influence them and that sort of thing. Now, I think that it's probably impossible to sustain that feeling very long if a very large proportion of the population is pretty heavily dependent on welfare funds. I think that heavy welfarization of a population in the context of our kind of society is going to have perhaps settle, but nevertheless erosive, erosive affects. So that I think feelings of at least a certain amount of self sufficiency and self supporting as independence, some at least modest level of affluence in terms of being able to go out and buy what you want, when you want it rather than being on some sort of let's say of relatively penny-pinching welfare budget. I think that there are economic correlus of self-pride and independence and peoplehood sorts of

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feelings. But just whence that employment would come from, that I did not say anything about. Where it has come from in the past five years is a matter of recent history and I made passing reference to that, I believe.

Q You're not suggesting though that a person becomes independent, necessarily by trading either the old dependency if you will on the fur market, for dependency on welfare, for dependency on the oil and gas industry for jobs? Now that by itself won't give a person a sense of independence. He's dependent on the company as much as he's been dependent on the other thing.

A Definitely. But I would argue, I think, that a person who has a job at current wage and salary levels is going to feel somewhat more independent than a person who is on welfare at current welfare levels.

Q Independent, I gather in the sense that he will have dollars to convert into other things in greater quantities than he presently has?

A And, may be able to save up in order to do something else that he might prefer to do instead and so on. He can plan a future and he can build toward a future if he's got some economic surplus. That's a possibility.

Q Are you not applying values that we have as white southern Canadians about those kinds of aspirations that people want jobs so that they will be able to plan for a future so that

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they will be able to buy things two years down the line? Is that not something that may not exist?

A I think that's a fair statement. My wording was that he can, not that he will, and a lot of people who have bought color television ^{sets} in Coppermine were buying color television sets because that's the thing that sort of turned them on at the moment. That's obviously apparent. But, more and more young people are getting more and more education and so our white values at this point do rub off to some extent. So that that kind of value socialization process, I would be personally confident, although I can't point to data is in the process of happening. The whole of the school system is oriented toward what sociologists for a long time have called deferred gratification. Postpone immediate gratification in favor of future gratification. That's true, the school system up here, as well as in southern Canada -- you can't be in school for a long time without some of that kind of thing rubbing off, although it's certainly countered to some extent by values from parents and peers ^{and} the rest of the community. We can't paint it in either black or white terms by any means.

Q You're talking of course about the school system being successful and you acknowledge, I take it, that even in the south the school system is not being entirely successful in promoting what you say. There are a large number of young people drifting about the country without looking into pension plans or getting mortgages. Now, do you

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base what you have examined in your report in a belief or an acceptance that modernization and industrialization are the inevitable outcomes of processes which have occurred so far in the western arctic?

A I don't know what is the inevitable outcome. This commission, in part, is in the process of deciding what is and is not, inevitable.

Q Let me put it another way Dr. Hobart, because I've been able to do this with some of the other participants and I've asked them if they assumed for example, that a pipeline would be built at some point in this area and that gas would be extracted. Not that it would be a particular application or at a particular time, but that that was going to be -- that was an accepted given from which they began their research for whatever participant they were employed by.

A And my answer to that is no. That is, my thinking has not been concerned -- I've not been interested in crystal ball gazing in my own thinking about whether one probably will or will not be built. The drift of my thinking, rather, is along a different theme, and that has to do, well, with the fact as it seems to me, and this is interpretation, that culturally speaking, we've crossed the Rubicon in this area. That if an attempt is made to go back to a predevelopment or a nondevelopment kind of situation, the people in this area are going to be more disorganized and are going to suffer more and I would expect the self/concept thing that we were

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talking about will suffer as well. And my reason for seeing it that way is that Anik is up in the sky and the TV broadcaster^{is} coming through, the Dempster highway will be completed. These 400 odd families in this area have had the kinds of income and have been able to do with the income the way they have. The kids have gone to school and so on. And I don't see how, having come this far, it's possible to turn around and go back in terms of the lives of these people. Basically, what I'm saying is that these things have happened as a result of decisions of southern whites and the price of these many decisions has been pretty heavy, I'm sure, for some people. There have been gains and there have been losses. People are alive who would otherwise not have been, but there's been confusion and disruption and parents having difficulty understanding why their children act the way they act, and all that sort of thing. But what I do feel, then, is to turn around now and attempt to go back in some sense, would be yet more disruptive than to pursue the integration or the acculturation drift that events have followed along consistently, it seems to me for at least the last fifty years.

THE COMMISSIONER: Let me just ask you one question before we adjourn for lunch. I ask you for another comment. You touched on something a few minutes ago that's an interesting facet of this comparison between the south and the north. When, in the last century, the west was opened up,

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it was opened because of the lure of agricultural land, people like the Ukrainians, and the -- Sir John A. MacDonald made it plain I think, that the policy of the government was to populate the west. That meant that by sheer force of numbers, the native peoples were soon overwhelmed. Now, you've made the point a moment ago that -- I think you did -- no Dr. Bliss made it last week in Yellowknife that there are no -- there's not going to be an agricultural industry in the north, putting to one side certain limited ventures along those lines in the upper Mackenzie and some and even along the river and some of these other proposals made yesterday. So that and the climate, means that you're not likely to have any approximation of the opening up of the west in the north. I'm not asserting that, I want to ask you to comment on that in a moment. The rise in the white population here over the last ten or fifteen years appears the largest component of that increased population would be attributable to government employment. The large government establishment in Yellowknife, another fairly large one in Inuvik and so on. The question whether that steep rise in the civil service establishment will continue in the next few years. In other words, is the -- is it your view that the dominance in numbers that native peoples enjoy now, at least they appear to enjoy, certainly in terms of permanent residence, there's no question about it, is that likely to be threatened or not. Have you any view on that that you'd like to express?

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A I'm sorry. I think I have to say that there's nothing I can say very confidently. I could spin out scenarios which would say that the white population will increase, will continue to increase rather rapidly and thus the, in a sense swamping, not as in the prairies but the outnumbering of native people will develop. I could spin out scenarios which would reverse that. The -- to some extent the answer lies with native people themselves assuming that some form of development does take place. If no development takes place, then it seems to me the answer is quite clear. Undoubtedly, native people will predominate. If some form of development does take place, then native people can to at least some extent, influence it in a theoretical sense, though perhaps not in a practical sense. In that, given the distaste of many whites for the extreme climate up here, native employees, if adequately trained and reasonably dependable; native representatives personnel in general, are preferable to whites in the view, my impression is of many companies doing business here. And so, to the extent that a cohort of appropriate native workers becomes available the likelihood of the swamping is reduced to the extent that it does not become available, then the swamping becomes that much more likely. And so, it seems to me that the thing that one can get a handle on, has to do with training programs and that sort of thing for native people to maximize their employment in such activity as may develop.

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THE COMMISSIONER: We will
adjourn till two o'clock then.

(PROCEEDINGS ADJOURNED TO 2 P.M.)

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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. BAYLY: Mr. Commissioner I apologize for being late. Dr. Hobart, we left off our discussion this morning with your making the statement that the people can't go back, with the implication I presume that they must go forward and do you feel that the way they must go forward is an inevitable thing? That they must go forward into either a modernized society or a modernized industrial society. Have you given any thought to that?

A Let me correct one thing if I may. I don't believe that I said they can't go back. It's a kind of hedonistic calculus that one does here I think, in terms of the costs of "going back" versus the costs of "going forward", the thing that I suggested I think was that there were so many influences that are immutable at this point, that is I don't think they are going to turn off the T. V. broadcasts and they are not going to close down the Dempster highway and so on, that, those things are immutable. The labour force has increased now, if one were to pull back and leave some of the highway and that sort of thing in place, the social cost, the human misery, it seems to me that would result from that, charting that kind of course, would exceed the costs and there certainly will be costs from some sort of continuing, broadly speaking lets say, development course of action here. Development, simply in the context of providing people with the opportunity to use the kinds of skills that they are being taught in school and so on. I want to clarify what I was trying to

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1 say this morning in that way. Now, your question then
2 was, would you mind repeating it please?

3 Q The question was when you
4 said that the people must, you said, the costs of going
5 back may be too great. Do you see alternatives in the
6 ways of going forward other than those proposed by the
7 gas and oil industry for this area? Alternative forms
8 of development, for example, alternate life-styles which
9 may not be the ones that we have brought here as an in-
10 creasing number of white people come into this part of
11 the world.

12 A Yes, I would think that
13 alternate kinds of life styles will certainly happen and
14 from my perspective, are most desirable because, certainly
15 not everybody is cut out for any kind of occupation and
16 well, I can think of individual people I know here who
17 will say I have so many sons and such and such, they are
18 interested in a desk job or they are interested in mech-
19 anical work or something like that, that so-and-so.
20 is interested in life on the land, he is interested in
21 hunting and trapping and that sort of thing and it would
22 seem to me that there is absolutely no reason at all why
23 people who have a continuing interest in more in a sense
24 traditional sources of livelihood should not and would not
25 be able to pursue these sources of livelihood. Now, in
26 terms of the way in which development should take place
27 I think I have to beg off from that question, because
28 I am not a geologist, I'm not a specialist in the econo-
29 mics of development so that what the range of options is
30 for this area, I don't know. I simply have to say that

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1 it currently is apparent that there are some development
2 actions and that's about as far as I can go I'm afraid.

3 Q Do you see all these de-
4 velopment options as being dependent on southern market
5 needs?

6 A Basically since fur trad-
7 ing displaced the subsistent economy, which was charac-
8 teristic of the area in pre-contact time, this area has
9 been heavily dependent on southern markets, so that I
10 cannot conceive of circumstances under which this area
11 would become independent of southern inputs and southern
12 economic exchanges.

13 Q Before we broke for lunch,
14 again, you spoke of the necessity or the desire in any
15 case, of peoples to have an influence on the development
16 in their own area and you talked about the possibility of
17 the people having development in a theoretical rather
18 than a practical sense and I didn't understand that.

19 A I remember using the theor-
20 etical versus practical phrase. I am not remembering
21 right now the context in which I used that. You can't
22 give me any help, I wasn't taking notes on what I was
23 saying.

24 Q As I understand, you, and
25 I wrote down as best as I could what you were saying,
26 you said that it was desirable for the people to have an
27 influence on development, on their own development among
28 other things, and you said that that was possible in a
29 theoretical if not in a practical sense. Or maybe it
30 is a phrase that doesn't make any sense. I don't know.

1 A No, I can't make sense out
2 of that either. We were talking about people being able
3 to influence the futures that were available to them and
4 that they were aware of and what I said, I think was that
5 I thought that was a good thing, and well, I guess, I
6 stopped there.

7 Where do you want to go
8 with that please?

9 Q Alright, let's leave that
10 if it's a difficult point but let's go at it another way.

11 Do you see it as being
12 important that people have a practical input into those
13 decisions which are made which affect their lives in
14 this area, in the delta region?

15 A Yes.

16 Q And, if I were to suggest
17 to you that it may be very difficult to get people to
18 participate in anything more than a casual way in what's
19 going on around them from the dominant culture if we use
20 your phrase, it will be difficult for that to happen un-
21 less they do feel that they have had a meaningful input
22 into the decisions that are made in the area.

23 A Yes, I would certainly agree
24 with that.

25 Q And do you see the plans
26 as they are presently presented as offering people the
27 opportunity, the native people the opportunity of parti-
28 cipating in the decisions that are being made on the de-
29 velopment of this area to this point?

30 A Well, certainly the

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1 proceedings of this commission are, involve giving air
2 to the kinds of concerns that are expressed by very
3 many people, many of whom are native people.

4 Q I understand that in terms
5 of expressing concern this may get us back to what you
6 called theoretical as opposed to perhaps practical de-
7 cision making, and I present to you the possibility that
8 if people feel that they haven't had an input into the
9 decision making whether they have had a chance to talk
10 or not they may not participate as fully as you and
11 others have forecast they may in any development that
12 may go on in this area.

13 A If that was a question,
14 I didn't catch the question. It sounded like a state-
15 ment to me.

16 Q Well I said that I sugg-
17 ested that to you for agreement or disagreement .

18 A And, what you are sugges-
19 ting is people may not choose to participate in develop-
20 ment in which they have not had a role in the decision
21 making process.

22 Q Yes and when I say parti-
23 cipate I did say in a meaningful way. It may be that
24 they will take a job for a month or two and then go to
25 something else or nothing else.

26 A Right. Well, I guess my
27 obviously speculative response would be that in native
28 ^{in this area as} populations' in the rest of Canada, there are people with
29 high levels of political awareness and concern and comm-
30 itment and there are people with very low levels of

1 political awareness and concern and commitment. You've
2 got a broad range, and there are certainly people, I
3 assume who would boycott as you are suggesting, employ-
4 ment in an area which they disapproved of for a variety
5 of reasons. There are certainly other people who would-
6 who are more interested in what they can personally get
7 out of it then they are interested in the political im-
8 plications, ramifications. I don't have any basis pers-
9 onally for assessing whether the level of political con-
10 sciousness in commitment is higher or lower among
11 native people here than among whites in the south. I
12 think there would be the broad spectrum though.

13 THE COMMISSIONER: Would you
14 have perhaps reached the limit of Dr. Hobart's usefulness
15 to us in this area Mr. Bayly? Propositions you put to him
16 are propositions with respect to which the views of any-
17 one in this room would be perhaps as helpful as Dr.
18 Hobart's and I would not, I'm sure you understand, I am
19 not denegrating you in any way when I say that.

20 Q I'm prepared to go on to
21 something a little less speculative, sir.

22 Dr. Hobart, regarding the
23 economics that you have discussed, you have given family
24 income figures which include income in kind for native
25 people. Page 30 of your prepared evidence. Could you
26 explain how that component of income was calculated and
27 could you give us an estimate of its reliability?

28 A Yes, that is data from the
29 Canadian Manpower Survey, and native people were inter-
30 viewed and there were questions there having to do with

1 game harvesting activities as well as with other sources
2 of real income. There is an arbitrary aspect clearly in
3 the monetary value that is placed on the wild meat.
4 I don't remember from that report the per pound value
5 that was placed on it. We are depending at this point,
6 the survey depended on the memories of the respondents
7 who answered these questions, I think these are sugges-
8 tive data but I doubt that they can be taken as very much
9 more than that. I included them because they are the
10 best data of which I was aware and I think there is some
11 need to make use of what we have that, with full awareness
12 of the weaknesses in the data and I emphasize the extent
13 of non-report. I should perhaps have said something
14 about the dependence on infallible human memory, for
15 that aspect as well.

16 Q Now if we can turn to the
17 evidence you gave on pages 34 and 35, which dealt with
18 the table on page 34, you stated that there were 438
19 families receiving money from exploration activity and
20 is this based on statistics on families or is it possible
21 that there were 438 individuals, some of which belonged
22 to the same family?

23 A That's possible, you are
24 correct at that point.

25 Q So the money may have been
26 coming into a smaller number of households.

27 A A smaller number, yes.

28 Q And nothing was collected
29 to find out whether that was the case.

30 A No.

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1 Q Now, with regards to these
2 jobs as well is it possible from the way the statistics
3 were gathered that one man held two jobs and was coun-
4 ted as two men? That he held a job from February to
5 April and another one from September to November.

6 A The official of the rel-
7 evant committee felt it was not possible in terms of my
8 knowledge of the way people do bounce around some. I
9 think, in fact that it is possible. I can't be certain,
10 but basically as I'm saying, in terms of what I know
11 about how people do drift from job to job and so on, I
12 think it is possible.

13 Q Alright, and this isn't
14 an uncommon phenomenon and I gather you have tested
15 this in your Coppermine work, people would take a job,
16 go home for awhile and take another job a few months
17 later.

18 A Right.

19 Q Now, you have suggested
20 on the same page, page 35 that exploration generated in-
21 come which for the delta region seems to vary abit, but
22 is generally around a million dollar a year figure, is
23 a substantial input into the income of many families in
24 the delta area. Now do you also imply that this is a
25 substantial contribution to the total regional income
26 among native people?

27 A Yes.

28 Q And, have you compiled
29 statistics showing the total income accruing to native
30 people in the region on an annual basis starting say in

Charles W. Hobart
Cross-Exam by Bayly

1 the mid sixties depression that you have referred to
2 and since the growth of exploration activities?

3 A No, I have not. I emphas-
4 ize that I am not an economist, and what I am saying
5 basically then, is simply a million dollar income is not
6 a drop in the bucket in as small a population pool as we
7 are looking at here. I'm not making any more precise a
8 statement than that.

9 Q Yes, we don't know what
10 proportion is represented.

11 A No, I do not. -

12 Q And I gather we don't know
13 whether it was an increasing proportion in the sixties
14 or throughout the intensive development period that went
15 on in the early seventies, intensive exploration period?

16 A Clearly, the onset of ex-
17 ploration activity began about ten years ago at the very
18 earliest, and it began from zero, so that we're talk-
19 ing about an increasing proportion up to a certain point
20 but if that proportion has reached ^{asymptote} and dropped off a
21 bit, that I cannot say.

22 Q Do you feel that the explor-
23 ation generated income is entirely a net addition to re-
24 gional income, or is it possible that it represents a
25 shift in employment from one gainful activity, which may
26 be for example, hunting and trapping to another, and
27 therefore may not be entirely an addition.

28 A No, there would definitely
29 be some shift. Right. The, what we are talking about
30 here is people who find exploration employment more or

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1 less attractive and more or less remunerative as compared
2 with other forms of activity which were available to them
3 and to some extent residually, these would be hunting
4 and trapping, I say to some extent because you cannot
5 pick up a trapping outfit just overnight.

6 Q Alright. Now, in order to
7 find out whether or not this was so, I understand that
8 you would have to not only look at peoples transfers
9 from one occupation to another but you would have to look
10 at people coming into the labour market to see whether
11 there were options that they did not exercise but exer-
12 cised the ones in the gas or oil exploration instead.

13 A Right. I might elaborate
14 on the thing I was saying a moment ago, by saying that
15 it's quite possible for people on work rotation schedu-
16 les in exploration employment to both trap and hold down
17 an exploration job. Because, the typical situation, as
18 I suggested earlier this morning is, two weeks at work
19 and one week at home, and, well, I've got some fairly
20 comprehensive data for Coppermine. Not the last win-
21 ter but the winter before that was a peak year in terms
22 of the fox cycle and in terms of the fur prices as you
23 may well know, and there was a very large fur harvest in
24 Coppermine. I don't have exact figures on how many
25 were involved because the fur management branch does not
26 release names, they will release the values of furs tak-
27 en, harvested by people from a particular community, but
28 you can't find out which individuals did that, but I
29 know from casual discussion with Coppermine people that
30 there was a fair number of people employed by Gulf and

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1 its contractors who were running trap lines on the side,
2 possibly with the help of a relative at home, so that
3 these are not completely exclusive, but they are to some
4 extent exclusive, definitely.

5 Q Alright. Now, that brings
6 me to a point in your evidence, where you were discuss-
7 ing the influence of kinds of technology on peoples tra-
8 ditional pursuits, and what you have just stated, I would
9 suggest to you, is that it is possible, for example with
10 a skidoo for a man to run a trap line when he is at home
11 and pick up a job with an oil or gas exploration company
12 for a short period of time, perhaps a month or two and
13 carry on traditional pursuits either on the weekends or
14 the week off, that normally, that previously he would
15 have had to spend his entire working life doing because
16 of the differences in speeds of travel and accessibility
17 of country in the vicinity of the settlement in which he
18 lives.

19 A I agree fully.

20 Q So it may be that tradit-
21 ional pursuits can be carried on in a different life
22 style in conjunction with some of the development activ-
23 ities that have been going on and may go on in the future.

24 A Right.

25 Q You suggested at pages 16
26 and also at page 28 of your evidence that there was a
27 period of depression in the native economy in the early
28 and mid sixties and you have attributed that in part to
29 external factors beyond the control of the delta region
30 and one of those was the falling fur prices and rising

1 commodity prices at the same time, and you have also I
2 believe, attributed it to a large shift of population into
3 to the settlements which disrupted at least temporarily
4 traditional patterns of land use and resource harvesting,

5 A Yes.

6 Q Now these coincided, as I
7 understand with the introduction of the motorized tobog-
8 gan, not exactly, but with its increasing popularity.

9 A Yes, the period, I had in
10 mind in terms of my own experience and, well, perhaps I
11 should back up and say, I did not attempt anything like
12 an in-depth economic exploration of this period. My own
13 contacts with the delta at that time and evidence which
14 Dr. Sager presented before the commission last March were
15 in identical agreement, as it were, so, the period I had
16 in mind basically was about 60-65. Now during that per-
17 iod, the skidoo was coming in slowly, there were a lot
18 of dog teams still around during that period. It was
19 coming in slowly, the slowness had to do both with the
20 ability of people to afford skidoos, and the fact that it
21 was yet being perfected to some extent. That is, people
22 talked pretty commonly at that time about parts that
23 broke down rather easily and that sort of thing, so that
24 there were two reasons for the slow build-up but the
25 point I want to emphasize is that it was a slow build-up
26 during that time. It was not a situation that a lot of
27 people in the settlements had skidoos and thus could yo-
28 yo out onto the land rather easily at that time.

29 Q Now, I take it there is no
30 way of telling whether, it was the increased exploration

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1 activity by itself that give a boost to the native peop-
2 les economy in a time when they were in this transitional
3 period or whether they would have as they had in the past
4 adapt to new ways of living and new technology as the need
5 arose.

6 A I have not collected the
7 data which would permit a definitive statement at that
8 point. As I ^{I was} said, depending in part on Dr. Sager's cor-
9 oborating evidence by way of justifying that point.

10 Q I gather it may be that
11 exploration activity was not alone in breaking this per-
12 iod of depression. There were other things, the fur
13 prices, the prices slowly started to rise and people did
14 find other alternatives.

15 A Yes. That's a fair state-
16 ment I think. I do not mean to attribute it solely --
17 my impression for which I cannot provide adequately de-
18 tailed documentation here, is that a major influence was
19 the increased availability of jobs, but I wouldn't by
20 any means claim that that was the only influence opera-
21 ting.

22 Q Now, you have asserted on
23 page 16 that there are already adequate employment oppo-
24 rtunities available in the region, at least in peak sea-
25 son. Now, do you mean by that, peak seasons for oil and
26 gas exploration activities?

27 A And the full complex of
28 related activities. That is obviously shipping is, ex-
29 cept there is a variety of spin-off kinds of employment
30 that are available at that time. I am told, that's in

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1 effect heresay and the, let me just clarify. It's the
2 last sentence in the first paragraph on page 16 that you
3 have in mind there.

4 Q That's correct, yes.

5 A Yes, and so what I'm say-
6 ing there simply, is that for the last three or four
7 years or so, anybody in the delta area here, who has
8 wanted employment during the exploration season is read-
9 ily able, has been readily able to find employment. I'm
10 saying no more and no less than that.

11 Q And I take it that basic-
12 ally there are more jobs than people who want to step
13 into them at most of these peak periods.

14 A Yes, in part we have to
15 differentiate between different skill levels of jobs of
16 course, and we have to differentiate between the kinds
17 of work which people find more and less attractive, but
18 certainly it's not uncommon during this time for whites
19 to ^{be} imported from the south for work that native people
20 would probably be qualified to perform if there were
21 native people available to do it. It's the number of
22 jobs at appropriate skill levels during the peak period,
23 typically exceeds the number of native workers available
24 in this area, is my understanding. That indeed is why,
25 Coppermine went to Gulf when they were seeking to tap
26 a native labour pool rather than tried to find that lab-
27 our within the delta area.

28 THE COMMISSIONER: Why Gulf went
29 to Coppermine, I think he meant.

30 MR. BALLEM: I think the witness

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1 misquoted himself.

2 WITNESS HOBART: Why Gulf went
3 to Coppermine.

4 THE COMMISSIONER: We know what
5 you meant.

6 WITNESS HOBART: Thank you.

7 THE COMMISSIONER: In each year
8 according to table four, there would be between, well be
9 tween 298 and 492 persons from the delta, chiefly natives
10 employed on exploration activity during the winter, or
11 as you say an average of two months. What is the total
12 work force in the delta on exploration activity? Do you
13 know?

14 A I don't have those figures
15 at the tip of my tongue. I'm sorry.

16 Q I wonder if it might be
17 possible, I'm not asking you to do it now Mr. Ballem, but
18 you might see if someone can tell us later on the total
19 work force in the delta in those years and the total num-
20 ber of man months. That would mean that we would have an
21 idea of the percentage of natives employed compared to
22 the total work force in the delta and the percentage of
23 man months out of a total of man months that they repre-
24 sent.

25 MR. BALLEM: What year's did you
26 have in mind sir?

27 THE COMMISSIONER: Well this is
28 table four and this is prepared by the oil and
29 gas committee, I think you said.

30 WITNESS HOBART: The data^{are} from

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1 their reports.

2 THE COMMISSIONER: It has prob-
3 ably been filed somewhere but it can easily be --

4 MR. BALLEM: Apparently, the
5 last three years is readily available it that's of any
6 use.

7 THE COMMISSIONER: That's fine.

8 MR. BALLEM: Alright sir.

9 MR. BAYLY: Dr. Hobart, in your
10 evidence you have talked about certain things that have
11 come into the north and perhaps you could clarify what
12 input you feel the native people had in the decisions to
13 bring these things in if you know. You talked about tel-
14 evision, for example. Do you know whether or not that
15 that was something that came in at the request of the
16 native peoples?

17 A I don't know in detail on
18 that, what I would have to say in general, is that the
19 changes have been imposed. That many of those changes
20 have apparently enjoyed a high level of native interest,
21 and I would have in mind there, things like, well, the
22 fact that southern built boats very rapidly displaced
23 the native built vessels that were in use up here prior
24 to the importation of canoes and Peter boats/^{and}that sort
25 of thing. The same is true of skidoos, the same thing
26 appears to be true in terms of television sales, that is
27 once the resource is ^{there} there, is very lively native interest
28 typically in making that resource personally available.
29 One could say, obviously, for example, that the availab-
30 ility of broadcast does not mean that people need to

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1 bring them into their own homes. People have pretty
2 erally brought them into their own homes, is my impress-
3 ion and I know that to be true in Copper Mine and its
4 their action that has done that. In terms of the Demps-
5 ter Highway, my impression is that there is very little
6 native input, if any there, certainly in terms of decis-
7 ions with respect to where schools would be built, the
8 nature of the curriculum and so on, with the exception
9 of the Rae-Edzo school, where there was substantial
10 native input into decisions there. There, in effect, has
11 been no native input into those decisions.

12 Q And that would apply as
13 well to the wage employment that came in as a result of
14 exploration and development.

15 A Clearly,

16 Q I'm not necessarily saying
17 that's a bad thing but the oil companies didn't come in
18 because they saw a bunch of native peoples without any
19 jobs.

20 A Clearly. The one excep-
21 tion to that in one sense, would be Gulf's Coppermine
22 program; Gulf consulted first with the settlement coun-
23 cil and said, "are you interested in making the kind of
24 employment that we could offer available to people with-
25 in your community," so that there a deliberate decision
26 was made by a representative decision making group of
27 that committee in terms of did they want it, did they no
28 To my knowledge, that's the only example of that kind of
29 deliberate decision having been made. I should add of
30 course, however, that whether an individual takes a job

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1 or not is, he has veto power over his own employability
2 in any capacity. There has been no compulsion, certain-
3 ly there.

4 Q Now, as I understand when
5 you're, as a sociologist assessing the impacts of some
6 of the things that you've just described, television,
7 highways, wage employment, you look for things called
8 social indicators. You look for alcohol consumption in-
9 crease, you look for increasing crime rates, violence,
10 family break-downs, child abuse, suicides, this sort of
11 thing; now in your studies, and you may want to refer
12 particularly to Coppermine . Did you find that there
13 was any change in these things that was at least co-
14 incident with the wage employment. Whether you can att-
15 ribute it to them or not I don't know.

16 A I can answer that question
17 quite specifically, I think. I have to restrict my an-
18 swer to the Coppermine situation. I have attempted to
19 explore and analyze the ability of those kinds of data
20 with respect to the delta here. The variety of influen-
21 ces is just too complex to be able to say anything along
22 that line at all. You have completely, you have develop-
23 ments completely unrelated to exploration, like the build-
24 up of the military establishment here in Inuvik and
25 other things of that sort which constitute a significant
26 impact and influences which cannot be sorted out. But
27 with respect to Coppermine, it's quite a clear situation
28 I think, because although there had been some sporadic
29 employment of people in various capacities in Coppermine
the
prior to Gulf program there, still these were essentially

1 small and affecting small proportions of the population.
2 To be very brief, during the first year of Gulf employ-
3 ment, and so we are talking about an employment season
4 which lasted from the 1st. of November until about the
5 1st. of May. The cash flow into the Coppermine commu-
6 nity increased by 75%.

7 THE COMMISSIONER: What winter
8 was that?

9 A That was '72-'73, so that
10 I am comparing cash flow in '72-'73 as compared with the
11 '71-'72 cash flow.

12 THE COMMISSIONER: And what
13 you say about the cash flow again?

14 A Increased by 75%, almost
15 twice what it had been the preceding year. I was able
16 to obtain liquor import information from the Territorial
17 Liquor Control Board and again, I am confident of the
18 accuracy of these data in terms of the impact on Copper-
19 mine as a whole, because there is relatively little tra-
20 velling between Coppermine and Yellowknife, of Copper-
21 mine people. They do not have the high mobility rate
22 that people in the delta do among the various delta com-
23 munities, so that the, I was able to obtain liquor im-
24 port information, liquor shipped into Coppermine
25 the same periods, November to the 1st. of June, I allowed
26 an added month for the last pay cheque of the year to
27 be partly expended on liquor ordered in, and so compared
the '71-'72 pre-employment with the '72-'73, first employ-
ment year, liquor consumption in Coppermine increased by
29%. I was interested in drunken violence in the commu-

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1 ity and the indicator at this point was people who went
2 to the nursing station and had to be sutured, had to be
3 sewn up, for injuries inflicted, or injuries, ^{received} or had to
4 be X-rayed for injuries, possible broken bones, and so
5 on, in fracasess where the nurses,--and they have been
6 there now for five or six years. They were well famil-
7 iar with the community. The nurses knew then, that al-
8 cohol had been involved in these fight situations, well,
9 so, that the number of such injuries increased, the first
10 year of Gulf employment from 11, the preceeding year to
11 18, during that year. Well, so that we have a definite
12 upsurge in liquor consumption and in drunken violence
13 the third index that I--

14 THE COMMISSIONER: How many
15 people are we talking about? In Coppermine there's
16 about what, 2,000-2,500 people?

17 A No, there are about 730
18 odd.

19 Q 730 people.

20 A People, population of
21 Coppermine.

22 Q And how many people were
23 employed? How many men were employed in the--?

24 A The first year a total of
25 53¹ different individuals were employed. All men. There was no
26 female employment at that time, so this was about half
27 of the male work force. I was also interested in the
28 possibility of child neglect. The most sensitive indi-
29 cator of child neglect that occured to me was the inci-
30 dence of respiratory illnesses. That includes a whole

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1 range of colds and pneumonia and otitis media, earache,
2 and so on and I obtained those data for infants and f
3 pre-school children. Now, there was no clear pattern
4 of increase in those respiratory illness data at all.
5 There was one month where there was, well for the incident-
6 ce of those illnesses was higher thanⁱⁿ any other month
7 during the year and that month, happened also to be, the
8 month of the highest liquor inimport into the community.
9 The nurses there were confident that these two were un-
10 related, the coincidence seemed questionable to me. The
11 interesting thing, very interesting thing in my perspective
12 is, what's happened in the two subsequent years of Gulf
13 employment in Coppermine.. I'm able to report in other
14 words on three years of that kind of experience, and in
15 brief, the second year of employment, the cash flow into
16 the community increased^{by} about 80% again, not only because
17 of increase in Gulf employment, but because there was a
18 big source of income in terms of furs. That was the
19 peak year in terms of prices and the fact cycle, so that
20 it was about an 80% increase in cash flow into the comm-
21 unity again. That year liquor consumption dropped by
22 as contrasted with the preceeding year. That is, in '73-
23 '74 it dropped by 12% as compared with '72-'73 in constant
24 prices. There was a cost increase so I took account of
25 that. The alcoholic violence dropped by one case. From
26 18 to 17. Again no pattern at all in the respiratory
27 illness situation. The third year of Gulf employment,
28 this is '74-'75 we're talking about now, there was about
29 a 10% increase in cash flow into the community as compared
30 with the preceding year, the rate of inflation would

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1 pretty well wipe that out in terms of real dollars I
2 would think so let's say, in effect that the income level
3 in the community remained constant. For profits were
4 down to somewhat less than one third of what they had
5 been the preceeding year, but the increase in explora-
6 tion income was enough to counter-balance that so that
7 it remained at the same level.

8 Liquor imports declined 15% in the '74-'75 year so
9 that at the end of the third year of Gulf employment,
10 the liquor consumption levels were down to about the
11 pre-employment level, which, I find interesting and per-
12 sonally, frankly, extremely gratifying, that people
13 could take in stride that radical an increase in cash
14 flow into the community, could adjust to the situation
15 as rapidly as they did. I really question whether a
16 comparable size community in the south experiencing sim-
17 ilar levels of affluence would have adjusted as rapidly
18 as that.

19 The drunken violence declined in a parallel fashion.
20 It was down to either 12 or 13 cases. One of the things
21 that I didn't mention and I can't tell the whole story
22 obviously, but the biggest jump in alcoholic violence
23 had been with married women as victims. That is the
24 married women category was the most frequent category
25 victim during that first year of employment. By the '74-
26 '75 year the married victim category was down esentially
27 to the pre-employment level again. Married women victims
28 were in the minority. Men were in the majority once
29 again. And again, no picture, no pattern, with respect
30 to respiratory illnesses.

The history of the city of Boston is a subject of great interest and importance. It is a city of many centuries, and its history is full of interesting events. The city was founded in 1630, and has since that time been a center of commerce and industry. It has been the site of many important events, and has played a significant role in the history of the United States. The city is known for its many landmarks, including the Freedom Trail, the Boston Common, and the Boston Harbor. It is also known for its many museums and cultural institutions, including the Boston Museum of Science and the Boston Symphony Orchestra. The city is a beautiful and vibrant place, and its history is a testament to the resilience and spirit of its people.

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1 Q Now what about welfare
2 payments?

3 A Welfare payments increased
4 in both the, I think, in all three years. That had to
5 do basically with policy with respect to the kinds of
6 things that people were paid money for. What one has to
7 say --Let me back up, is that Coppermine has not been a
8 welfare problem area, welfare problem community within
9 the 1970's period. I did not delve back into the sixties
10 in terms of the data that I'm looking at. I simply can-
11 not comment on that.

12 Q If I were to suggest to
13 you Dr. Hobart that the totals for assistance in the
14 three year period starting '72-'73 and going into '74-'75,
15 the total welfare payments went from approximately
16 \$27,000.00 up to \$71,000.00, so would you agree with
17 that?

18 A Yes.

19 Q And, would you agree that
20 if we broke those down that with regard to health in
21 that period they went from \$12,000.00 to \$31,000.00 app-
22 roximately?

23 THE COMMISSIONER: You mean the
24 expenditure at the nursing station? That sort of thing?

25 MR. BAYLY: Q Yes, I'm break-
26 ing this figure down.

27 THE COMMISSIONER: Mr. Usher is
28 shaking his head.

29 MR. BAYLY: That's for medical
30 payments as I understand. Yes, I'm breaking this down

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1 sir, and the reasons for granting this yearly amount of
2 money--

3 THE COMMISSIONER: This is a
4 breakdown of the earlier figure 27,000-71,000.

5 MR. BAYLY: 27 to 71, yes.

6 THE COMMISSIONER: What were
7 the years again, what was the first year you gave the
8 figure for 27 thousand?

9 MR. BAYLY: '72-'73 Sir. I
10 can make this clearer. I have the copy here and I'll
11 put it in as an exhibit and show it to Dr. Hobart as
12 well.

13 THE COMMISSIONER: Well, it's
14 clear enough and so all these figures you have given me
15 are clear enough.

16 MR. BAYLY: Alright.

17 THE COMMISSIONER: Q What was
18 the 71 thousand? What year was that?

19 MR. BAYLY: A That's for '74-
20 '75 sir. '73-'74 figure that I have as a total is \$51,
21 706.00 and '72-'73 is 27,357 and these figures are broken
22 down by the government of the Northwest Territories Dept.
23 of Social Development into various categories. One is
24 Health, the next one is Dependent Children and perhaps
25 you can tell me if you are familiar with these.

26 WITNESS HOBART: A Yes, I'm
27 broadly familiar. I couldn't tick them off for you right
28 now, but yes, I'm familiar with them.

29 Q The next one is called
30 Economic, I assume that is Income Supplement whatever?

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1 and the next one is called Supplementary, that perhaps
2 is Emergency Welfare.

3 A Right.

4 Q Starting with health, the
5 figures for 1972-73 that I have and invite you to agree
6 with them approximately, are 12,784 dollars, for '73-'74
7 they are \$35,140. and there is a drop in '74-'75 to
8 \$31,332.

9 A M-hm.

10 Q And, for dependent child-
11 ren the figures go from '72-'73, \$10,032. to \$12,969
12 in '73-'74, to \$21,378 in '74-'75, and under Economic
13 they go from \$4,127 in '72-'73 down to \$3,417, in '73-
14 '74, up to \$18,702 in '74-'75. Would you agree with
15 that approximately?

16 A Yes, I have obtained those
17 figures from the Welfare Dept. and those sound like the
18 figures that I obtained, but I don't remember them in
19 detail.

20 Q Now, the Supplementary,
21 to complete the picture, \$414 in '72-'73, \$180 in '73-
22 '74 and \$394 in '74-'75.

23 A Yes.

24 Q Now what you have said,
25 is that there were different reasons or criteria for
26 giving out this money. Does that account for all of it
27 in your opinion?

28 A Well, basically, I have
29 been interested in the logical disparity, or contradic-
30 tion between increasing cash flow into the community and

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1 increasing welfare monies being paid out, and I have
2 made inquiries of the office in Yellowknife, trying to
3 get a handle on what would explain this seeming contra-
4 diction. The only thing that I have gotten out of them
5 at all, is that they have had some policy changes which
6 are reflected in this. That is, the people that I've
7 talked to have not suggested that there were "problems
8 in the area which had snowballed, or which had built
9 up, which they had to respond to in terms of increasing
10 welfare payments." Now, that's not a very satisfactory
11 explanation, but I can't add to it any beyond that.
12 That's what I've been told and I'm not aware, I've in-
13 quired of the nurses at this point and they've not told
14 me anything to suggest that specifically those health
15 problems appeared to be alcohol related, or they were
16 unaware of health problems from their perspective which
17 would explain the figures that you have been alluding to.

18 Q Alright. Now would that
19 hold true of other communities, or would you not be in
20 a position to speak to them, because I have figures here
21 for Tuktoyaktuk as well?

22 A Yes. I do not have those
23 figures for other communities. So, I can't comment on
24 that one way or another.

25 THE COMMISSIONER: Well do you
26 Mr. Bayly, do you say that the figures for Tuktoyaktuk
27 show the same tendency for welfare payments to go up in
28 relation to the increase in wage employment.

29 MR. BAYLY: Yes I do sir, we
30 have the figures from Dr. Hobart's evidence on what has

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1 happened in terms of wage employment in Tuktoyaktuk from
2 the figures he has and the indication is that at the
3 same time welfare payments went up. I'm not offering
4 any reason for it because I'm not in a position to, but
5 I wondered if Dr. Hobart could offer any explanation.
6 Now he said that he specialized in Coppermine, and I'm
7 content to leave it there. The reasons are just not
8 known. Some of them may be policy.

9 WITNESS HOBART: Nobody whom
10 I've talked to and I've talked to quite a few people has
11 suggested at all that this is related to an increase in
12 the incidence of problems, but it's possible that it is.
13 Nobody has given me any indication of that.

14 THE COMMISSIONER: If I might
15 interject for a moment, this is your evidence about
16 these matters relating to the consumption of liquor and
17 so on, is very interesting and important to us in deter-
18 mining the social impact of development in the Mackenzie
19 Valley and the delta and predict what it will be if this
20 gas pipeline and dependant developments occur, but there
21 is something missing from these figures, it seems to me.

22 MR. BAYLY: I was about to sugg-
23 est that there might be something about how the liquor
24 came into the settlements.

25 THE COMMISSIONER: Leaving that
26 out for the moment, you might, Mr. Bayly, you will be
27 hearing your evidence I hope, by Monday and through all
28 of next week, but if you can, you might next week tell me
29 whether there is anyway of determining whether the number
30 of families receiving welfare, take your '72, '73, to '74-'75

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1 increase which is almost three fold, 27,000 to 71,000,
2 the extent to which that indicates an increase in the
3 number of families receiving welfare. The second thing
4 that's missing is whether those families consist of or
5 are families where members of the family, the bread-
6 winner for instance, is employed on exploration. At any
7 rate if it's possible to give us any light on that.

8 MR. BAYLY: We'll attempt to
9 get those figures from the Territorial Government sir. I
10 hope they will co-operate in that.

11 Q Dr. Hobart, just
12 before we leave ----

13 THE COMMISSIONER: Excuse me.

14 MR. BALLEM: I wonder Mr.
15 Commissioner with your leave if I might suggest that
16 there is yet a third factor that it might be worthwhile
17 to know what has happened to those payments in other
18 communities not affected by this.

19 THE COMMISSIONER: A good point.

20 MR. BAYLY: We can certainly
21 ask the Government for those figures sir and hope that
22 we will be successful in obtaining them.

23 THE COMMISSIONER: If we don't
24 get them next week, then I'm sure we will get it in
25 Phase four through Commission counsel.

26 MR. BAYLY: Dr. Hobart, I take
27 it that the figures on the amount of alcohol coming into
28 the community as they come from the Territorial Liquor
29 Commission, reflect those sales that go in through the
30 Post Office at Coppermine, and not liquor that may be

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1 taken by workers working in the delta that pick up liquor
2 in Inuvik to take home.

3 A Let me elaborate on that.
4 During the first two years, there was simply no opportu-
5 nity in the period that I've restricted it to, that is
6 the 1st. of November through the 1st. of June, employ-
7 ment season broadly speaking, because Coppermine work-
8 ers were without exception picked up at the work site
9 the plane may have dropped into other work sites and
10 picked up other workers, and then it went to Coppermine
11 without a stop-off, a layover in Inuvik at all. The only
12 exception to that was it happened once or so in the summ-
13 er that the plane had to put into Inuvik. I've not check-
14 ed with equal care with respect to the '74-'75 employment
15 season but it's my impression that again the same policy
16 was followed throughout. It was interesting to me that in
17 the first couple of years there was never a request from
18 a Coppermine worker to spend his long break as the week
19 off is termed, in Inuvik. The men returned home and never
20 requested anything to the contrary, so that I'm confident
21 from these facts that liquor originating let's say in the
22 Inuvik liquor store did not find its way over to the
23 Coppermine.

24 Q They did spend their short
25 breaks here is that correct?

26 A Well, there is no such
27 thing as a short break; that is the men work 14 days
28 hours a day as I said, and at the end of that time they
29 go home. It's called a long break because it's a week
30 long instead of a weekend break, but that's the, so

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1 they're home or travelling to or from or at the work
2 camp where they are working twelve hours a day.

3 Q Right. So we don't know
4 for this year whether workers from, at this point of the
5 Inquiry anyway, whether the workers from Coppermine have
6 access to Inuvik?

7 A I'm saying that during the
8 first two years, I am confident that they simply did not.
9 My impression from discussion with people in Gulf official
10 capacities is that that pattern yet persists. I cannot
11 say that I narrowly questioned people so that there may
12 have been an exception or two. That kind of an oversight
13 in my information is possible, but I am sure that there
14 is no pattern of dropping people off at Inuvik.

15 Q You didn't examine the
16 records of the airlines to see whether there were more
17 charters going over to Coppermine with the introduction
18 of people from there to the delta.

19 A That I have not examined.
20 No.

21 MR. BAYLY: Mr. Commissioner,
22 I don't know whether the coffee is ready, but this is an
23 appropriate place for me to break and see where I am
24 going next.

25 THE COMMISSIONER: Okay, fine
26 we'll break for a few minutes.

27 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)
28
29
30

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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

1 THE COMMISSIONER: We'll come to
2 order ladies and gentlemen. Mr. Ballem?

3 MR. BALLEM: I was just going to
4 make the comment, Mr. Commissioner, that over the break I
5 believe that the witnesses had an opportunity to confer
6 with the appropriate Gulf official so he might be able to
7 complete his answer for this current year.

8 THE COMMISSIONER: Oh fine, go
9 ahead please.

10 A There are perhaps two or
11 three things that I might add. The one is that the policy
12 in terms of transporting people from camp to Coppermine
13 and back has not changed at all during the 1974-75 year
14 as compared to the two previous years. An exception to
15 that of course is if a man falls ill and has to be hospi-
16 talized. Under those circumstances he's brought into the
17 hospital at Inuvik and either treated there or perhaps
18 transferred elsewhere. But that does not constitute an
19 exception to the, in a sense, control arrangements that
20 we described. I learned also that it's a matter of offi-
21 cial Gulf policy not to permit the transporting of liquor
22 in the plane that transports workers back and forth be-
23 tween the Delta and Coppermine, and finally I learned from
24 a resident of the community that to her knowledge at least
25 somebody in Coppermine has a relative in Inuvik and it has
26 happened on occasion that that relative has, in effect,
27 affected a bit of -- facilitated -- the smuggling of
28 liquor on the Coppermine plane into Coppermine, so that
29 that has happened apparently occasionally and it's not
30 surprising. I'm sure the same sort of thing would happen

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1 if it were whites we were talking about. However, given

2 --

3 THE COMMISSIONER: It might
4 even have occurred before Gulf went to Coppermine.

5 MR. BAYLY: Thank you, Dr.
6 Hobart. I think we've gone as far as we can with that.
7 As far as detectability is concerned, there's no open
8 transportation back and forth of liquor from Inuvik to
9 Coppermine. Could we go onto another subject then and
10 that is with regard to your evidence at page 22 where
11 you talk about dependency, and we have been over this
12 somewhat before. I gather that you are speaking of
13 independence in the context that it's in the evidence
14 to mean the freedom to have money to spend on things
15 that a person might want rather than the lack of depen-
16 dence on an employer, a market, or a government for
17 welfare payments.

18 A I think I've used depend-
19 ence -- independence -- in at least two senses. The
20 one is that in many respects the philosophy back of
21 governmental programs has been that these people are
22 incapable of providing for themselves and so there have
23 been organized caribou hunts, for example; and there
24 have been fishing projects and quite a variety of
25 those sorts of government-organized resource harvest-
26 ing activities among other things, and the consequence
27 of that is that instead of people acting on their own
28 volition or autonomously, a white government functionary
29 usually has organized an activity. The thing that
30 concerns me about that is that the implication of that
kind of activity is that people are unable to do things
for themselves; and that kind of an implication strikes
me as destructive. At the same time I have to acknowledge

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1 and emphasize that some of the consequences of these
2 activities have certainly been helpful in terms, as I
3 say, of people being alive who would not otherwise be
4 alive. But as one looks over the scope of the period
5 that we're looking at, there was a considerable buildup
6 of these sorts of activities in the late '50's and prim-
7 arily during the '60's and the consequence was, I
8 think -- and this is an impressionistic statement --
9 that people came to depend more and more on the govern-
10 ment to organize things which at a previous time they
11 had done for themselves.

12 Now, there are exceptions to
13 this and people of Sachs Harbour constitute the most
14 obvious exception to this deepening dependency kind of
15 a thing. But I can't read the record any other way than
16 to see this as having happened.

17 ' Q All right, and so when
18 you're talking about independence that one would gain
19 from having employment in, say, the gas and oil in-
20 dustry, that's the second kind and it's restricted to
21 a financial and perhaps whatever status that gives
22 independence. We can't relate that to a change in the
23 social dependency on governmen t or lack of it, or to
24 political independence.

25 A Right. One way of putting
26 what I've been trying to say here, I suppose, is that
27 a fair exchange relationship there is a degree of
28 independence which in a one-way reciprocity relationship
29 there is not and the acceptance of government help in
30

1 its various kinds is the one-way redpiency kind of
2 thing as contrasted with the exchange of labor for in-
3 come which is characteristic of employment by the govern-
4 ment and/or ^{activity} employment in the private private
5 sector. Now I'll certainly grant you that there is -
6 there's vulnerability in that if you're, you have this
7 wage employment and you're laid off or the activity
8 closes down, then you're out on your ear. There's vul-
9 nerability, but I think that's different from the de-
10 pendence notion that I was suggesting.

11 Q Now, if I can go to page
12 35 of your evidence. You've characterized the, I may
13 have the wrong page reference , but in your evidence
14 you've characterized the sift from Aklavik to Inuvik as
15 a sift from an egalitarian community to one in which there
16 was far more discrimination. And I think if you wouldn't
17 mean from that to depart from your earlier evidence that
18 they were among the traders, the church, and the govern-
19 ment officers that went into the community in the earlier
20 days certain elements of difference in life style that
21 were expressed in discriminatory practices, social inter-
22 actions, etcetera.

23 A Surely. As equalitarian
24 and discriminatory are relative statements and I'm using
25 those in a relative sense rather than in an absolute
26 sense. I suppose we should say that the approach of the
27 church is, by definition, prejudicial in the sense of
28 viewing non-Christian people as inferior and perhaps in
29 some sense doomed as compared with Christian people and
30 so on, so that that kind of prejudicial perception of

1 un Christians -- of non-Christians is foundational to
2 the approach of the church and that I did not mention,
3 but that certainly is a part of it. Once people became
4 Christianized, that perjorative definition of them dis-
5 appeared of course.

6 Q And with regard to the other
7 white people who came into the settlements like Aklavik
8 in the early days, we can't really say that in all ways
9 they felt the same as the native peoples or native peoples
10 felt the same as them just because they all used honey
11 buckets.

12 A No, but I am trying to
13 suggest here basically that the lifestyle in general
14 of the Aklavik community was broadly egalitarian. Every-
15 body in pretty much the same boat in a way that the life-
16 style in Inuvik during the first two years of Inuvik in
17 particular was not at all egalitarian. The differences
18 between the serviced and the unserved areas of town
19 were, if not black and white differences, at least dif-
20 ferences between very light and very dark shades of gray.

21 Q Just before lunch you an-
22 swered a question and said that in many ways the compan-
23 ies would prefer to have native peoples working on their
24 projects because they have adapted to the climate or are
25 used to the climate which for a southern worker might be
26 a very harsh one. Is that correct?

27 A Yes, I think so.

28 Q All right now, that im-
29 plies I gather outside work. That's what you meant by
30 that. It doesn't matter if you're inside a building.

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A Yes. I think we're talking about employment in the north of whatever category because it -- well, white people are not indigenous to this area -- are not born to the area with a few -- well very few exceptions.

Q So, the concern that I have, Dr. Hobart is that looking at particular adaptability to cold may restrict native peoples and the kinds of jobs that the company sees that they are fit for because they may be very good at working outside.

A Maybe I misunderstood you. What I thought you said and meant to be saying was that the -- how shall I put this? The likelihood of turn-over in the longer run is higher among southern whites who come up here for a brief jaunt -- maybe a year, maybe a couple of years, and then go back, than among native people, who, assuming they are equally well trained and qualified for the job, are at home and have no particular desire to return home. So that there are numerous examples, as you are aware, I am sure of native people working in inside jobs as well as in outside jobs. There is certainly no evidence at all to say that native people are intrinsically more or less qualified for the one than for the other. So that I can't see any reason to suspect that there would be a discriminatory element of this sort, given the fact that there are certain inescapable disadvantages of hiring whites for work in the north where that work is going to stretch out indefinitely.

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Q Let's examine that in light of your second report for Gulf Oil called "Inuit Employment, 1973-74, Coppermine, Northwest Territories". Do you have a copy of that report?

A I don't have one with me.

Q I'll read to you from it then, and perhaps you can comment on this. At page 37, ^{the} beginning of chapter 4 of this report, there's a heading "Work Effectiveness of all Workers", and quoting, starting at the bottom line of this page, says "The data in Table 4.1 show that the Coppermine workers stayed on the job longest during the 1973-74 season, followed by the southern workers, with the delta workers working least of all. Two thirds of the delta workers worked no more than four weeks. Indeed 56% worked no more than two weeks as compared with 37% of the white workers and only 19% of the Coppermine workers". Now, you talked today about the long term and I gather this is not the long term.

A No. That's transient workers we are talking about there, seasonal workers. They are not permanent employees of any of those companies. They work during the exploration season November to the first of May, approximately and then they are off. So, I think a sharp distinction needs to be drawn between seasonal employment and permanent employment.

THE COMMISSIONER: Dr. Hobart, I thought we were talking about seasonal employment.

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The figures you gave us in table 4 relating to employment were -- that was all exploration activity in the delta, wasn't it?

A Definitely. I understood Mr. Bayly's question to have to do with the likelihood of certain future employment practises on the part of companies which might be established -- carrying on an ongoing business here. Mr. Bayly, is that so? I thought --

THE COMMISSIONER: You mean if there was a gas plant and so they needed twelve people round the -- year round?

A Yes. I understood that that was the kind of situation that your question pertained to. Was I mistaken at that point?

MR. BAYLY:

Q Well, you have made the distinction and if it is ^a distinction that you feel should be brought out, I'm prepared to accept it for the moment and if I understand it, your feeling is that you can't equate seasonal workers who may come on the job with the expectation of working a month or two months with a guy who ^{will} make the committment to take a job, a training course and sign up for a career.

A Yes.

Q And you are confident, as I understand that there will be people in appreciable numbers from the delta who will take that step of applying for these more permanent jobs that will be available in the gas production industry.

A Yes. My basis for that

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confidence is another bit of work that I have done that you may well be familiar with. I was asked by CAGSL to do an evaluation study of their training program and so I learned a fair amount about both the raw statistics of that operation -- the drop-out rates and that sort of thing, and we interviewed trainees and got their subjective reactions and so the basis for my feeling, then, is that, on the one hand, there have been a lot of people who have been quite eager to get into that training program. The drop-out rate has been approximately one quarter there, if I am recalling my figures correctly. And this despite the fact that there was a fair amount of dislocation and a fair amount of -- well -- experience that these trainees had not had very much of prior exposure to. That is, most of the training situations in the south of Canada involved isolation not only from family and peers, but frequently involved isolation of native people in white groups with only one other native trainee available to relate to. I feel that, then, to be a rather difficult kind of social situation, to put a person in the context of some other stresses that were an inevitable part of the training situation and given the, as it seems to me, the rather high level of performance and high level of commitment to that kind of training program under the chancey circumstances that exist now. They don't really know whether there will be jobs up here for them or not. That the performance indicates -- well -- augers well for the interest and the committ-

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ment, the dedication of a certain proportion of native people to this kind of work, if and when it becomes available.

Q Well Dr. Hobart, it appears to me that you are more optimistic than you were in your evaluation of the Nortran Training Program and if I can refer to that volume at page 42 and you say there, that "it is apparent that recruitment has thus far been largely restricted to areas having larger concentrations of population. The Mackenzie Delta community -- the Mackenzie Delta, communities around Lesser Slave Lake, etc. There are many smaller communities on the Arctic coast -- Holman Island, Gjoa Haven, Spence Bay to say nothing of the settlements in Keewatin and Baffin districts and in inland areas of the Yukon and Northwest Territories such as Snowdrift, Wrigley, Fort Norman, where there has apparently been little or no effort to recruit prospective trainees. There is no reason to think that trainees -- there is reason to think that trainees recruited from these settlements might will turn out to be more reliable and more resistant to quitting than those from the larger and more centrally located settlements. Accordingly, we recommend that efforts be made to expand the recruitment of new trainees to some of the smaller and widely scattered settlements north of 60. From that it appears that you felt that maybe this area in which the development is most likely to take place may be the least likely to produce permanent employees" and is that still the

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case?

A I don't think that statement that you read, or the series of statements, were optimistic or pessimistic. It was a fact in the first place that the recruitment had been from these larger centers. The recommendation was based on some other scattered information that I placed an interpretation on. But, what I am saying here today, and what I would have ^{said} if you had asked me at the time that I wrote those words, I think, was that the picture of performance of the people who were recruited was not a bad picture. It was a good picture. I suspect that recruitment of people from these smaller, lesser opportunity places might have been even better. That's speculation, obviously, but that is not in any sense to cast an aspersion on the trainees who were recruited. It is simply a recommendation that it be expanded and perhaps the people recruited from these other areas might turn out to be even better.

Q Well, when you say that it has been pretty good, I have letter here that I'd like to put in as an exhibit later on in the day, sir and I'll make copies available. From the Nortran people, signed by Mr. Virtue to Gale Noble of the Committee for Indian Peoples' Entitlement, which says, among other things that terminations from the program have been approximately 45% per year. Was that what you expected?

A I don't know. Again, I think I entered that study with no pre-conceptions.

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The thing that I felt was that it involved plucking people out of one physical environment and dropping them into a different physical environment. Plucking them out of one social context and circle of friends and relatives and dropping them into a radically different social environment in isolation from friends and relatives, that this kind of extreme dislocation experience is difficult for anybody. I guess I've experienced some of that myself in earlier years. And, given the extent to which the lessons of deferred gratification that I talked about this morning, are not well drilled as far as many native people are concerned. I had forgotten just what the drop-out rate was, but my basic impression was that if it had been distinctly higher, I certainly would not have been surprised, given the difficulties of the social experience which these people had to cope with.

THE COMMISSIONER: The Nortran program is the program under which the oil and gas industry takes people from northern communities to Alberta and provides them with training and jobs in the existing oil and gas industry there.

A That is correct.

Q And you say that that means these young people, young men -- leave their homes in the north and their communities and that if they were simply going to work in gas plants in the delta, returning home if not daily -- oftener than they do when they go to Alberta -- you would expect a lower drop-out rate?

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A Yes. Definitely.

Q That's the size of it?

A Definitely

MR. BAYLY:

Q Now, Mr. Commissioner,

that brings me to my next question because in reading the applications that the producers have -- I'm sorry, the evidence that the producers have put before us, I read in that that one of the producers, and I believe it's at Parson's Lake, plans accomodation with two men to a room. And there's no mention in that of family accomodation so I am assuming, and you can correct me if your understanding is otherwise, that people will be taken from their families to do even the permanent jobs involved at the gas plants. And if you have any thoughts on whether or not that will encourage deferrment of pleasures -- I think I've got the phrase wrong but --'

A Deferred gratification.

Q Deferred gratification.

A I don't know anything about any of the proposed gas plants. I've not read up on any material there. I've not been supplied it. I've not asked. So that your question then, I gather is something like, which would I feel would be more, would tend more to motivate dependable performances from native employees in the gas plant situations, is that the question?

Q Well, that's part of it.

My concern may be more with the happiness and satisfaction of the workers than their dependability,

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but I think the two probably go hand in hand.

A Yes. I'd agree. I've not thought about it at all. A precedent for the isolating of families from the community -- that is the worker has his family with him, but the family is isolated from its community was found in the Dew Line and I guess is still found in the DewLine where there are Inuit employees working at Dew Line sites and housing is provided for the family there. At the time that that was done, people were more used to scattered existence because settlements had not emerged -- crystallized to the extent that they have now. I guess basically, my reaction would be that in the case of single men, there would probably be be less dissatisfaction with that arrangement than in the case of married people.

Q You are not suggesting careers of celibacy though?

A No. The further problems though are that in the case of families located there as you are suggesting, children would have to live in town away from their families, if they were school aged children. I'm afraid, in brief, I can argue both pro and con and off the top of my head, I don't know which button I would push if I had to press a button here today.

Q Now, if you were a person who was looking for a career and it was possible to drive to work from Tuktoyaktuk or from Inuvik or fly there every few days, I take it, it might be easier to

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separated from your family than if you were from Spence Bay and only got home one week a month or one in three weeks.

A Clearly.

Q So it may not be the case as you suggest in your evaluation of the Nortran program that in terms of long term workers, that successful recruitment will be from the settlements which are more isolated or in the Keewatin.

A It might not be. I agree with you. I would add, however, that there is increasing mobility among various settlements in the Arctic, so that I suspect that there is an increasing proportion of people who are willing for proper advantage, whatever that might be, to leave their settlement and move to another area. But that's speculative, again.

Q Well, before we leave your comments about single men, I have here again your second report on the -- to Gulf Oil -- at page 188 where you are dealing with certain people that were employed from Tuktoyaktuk and you say at that page in the second paragraph under Tuktoyaktuk:

"It is quite apparent from the high proportion of men who were so briefly employed that Gulf was scraping the bottom of the barrel, at least as far as motivation is concerned, if not as far as potential is concerned. The fact that many of these men were single, though well past the age when most Coppermine men are married,

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points to the great erosion of certain more traditional Inuit patterns in Tuktoyaktuk, and their relatively poor work showings of the majority would suggest the same point.

It seems clear that Gulf related employment was not attractive to most of the Tuktoyaktuk residents, perhaps in view of other dependable employment that was available."

Now, were you scraping the bottom of the barrel because of the eroded values or were you scraping the bottom of the barrel because everybody else was out doing something else?

A I think what I had in mind when I was trying to put together sentence, was that the employment market in the delta at that time was basically a seller's market. There were jobs going begging and the situation then was that if you worked for a work rotation or two or three and quit, you were quite sure of being able to pick up another job within just a few weeks. Now, the value part, and I don't -- that's a fairly involved sentence, I'm afraid and I don't have the thing very well in mind -- points to -- what I was trying to say there, I think, was that the earlier pattern was one of earlier marriage. In this particular subsample, and I don't have any idea whether that subsample was representative or was simply the minority which happened to not have gotten married yet. But the typical pattern was for earlier age of marriage and the fact that they were not yet married shows

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atypicality. Non-traditionalism in that respect in them.

Q I'm a little puzzled with that in relation to your statistics in Table Five, and there may be an explanation for this that you can give, perhaps because the dates are different. But in that table under Tuktoyaktuk in 1971 when you divided -- this is at page 37 -- when you divided the community by kinds of employment, you said that there were 5% fishing and trapping and then there's other -- should that be extractational industry?

A Other **extraction** industries yes.

Q Yes. There were none. In manufacturing there were 5%. Utilities and public service administration, 23%, and then a very large part of your sample was unspecified. Now was that the case when you looked at the figures for the report that you did for Gulf Oil?

A Let me clarify. These are census data in 1971 in Table Five so that the census interviewers talking to the Tuk men had found that 67% of them did not specify their occupation. What happened -- my interpretation of this would be interviewer effect, that is if you are dealing with a highly literate population with strong opinions on issues, interviewer effect tends to be relatively minimal. If you are dealing with a rather opposite kind of respondent, then an interviewer may succeed in suggesting a response to the people he is

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interviewing rather easily and my private interpretation of that very high unspecified would be that the interviewer suggested well, if you do this and if you do that, perhaps the best thing we should do for you is to not specify a particular occupation. There is obviously no other very sensible explanation, I think, to explain those disparities between 1961 and 1971 census returns from Tuk.

Q I refer again in your report to something which is of concern to people in the delta, page 191, and that is reactions of workers separated from home.

A I'm sorry. This is the second report?

Q The second report, yes. And I'll read from that report for you as well.

"The delta workers were asked 'While you were working for Gulf, how did you feel about the following?'"

The issues dealt with and responses received are found in Table 91. Then in analysis, you say:

"These data show a ^{strong} pattern of dislike of the separation experience, very much stonger than we have found for the Coppermine workers and quite comparable with that found for the southern workers, in fact."

A large part of whom I assume were married, or largely married.

"This clearly demonstrates that we have implied at a number of points that the

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delta workers are much more acculturated to southern ways of living and southern feelings and reactions than are the Coppermine workers. Thus whether it is that the delta workers feel the separation from family and community more keenly than do those from Coppermine, or whether they merely report their feelings more honestly or more strongly, we cannot say. Both would be very much more characteristic of southern whites than of the traditional Inuit. It is noteworthy, however that the delta workers say they dislike separation from friends and relatives and dislike not being able to take part in community activities in substantial numbers, much more so than is true of southern workers. The fact that so many of the young unmarried men said that they dislike separations from friends and relatives and being unable to take part in community activities would seem strongly to imply that following marriage, they will dislike separation from wife and children more intensely, unless events cause them to come to adjust to and accept such periods of separation. The latter seems distinctly unlikely."

It appears then that at least as far as the sample that you asked your questions to, it didn't matter very much whether they were single or married, they felt this separation -- and in light of the plans

to have men only accomodation, it may be, I suggest to you difficult to persuade people, in the delta anyway, to follow a career that involves separation for periods of time from their family over a long

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period of time.

A I would agree that those, that pattern which had slipped my mind in the -- I have not reread that since I wrote it I guess and -- no, I would agree that the implication of those data would be to say that better moves -- better try to make family arrangements. I suppose it does need reiterating that the question of how the schooling needs of children would be dealt with under those circumstances is, itself, a difficult question and so there are -- there is no easy and clear and completely satisfactory resolution to that question that seems to me sitting here now.

Q Now I take it, if we were to apply what you have analyzed from delta communities to some of the communities on the fringe of the delta that are likely to be concerned with oil and gas development and this might include Paulatuk, Sachs Harbour and Holman, as well as some of the Dene communities farther to the south, you'd have to look at each one of those in this experimental fashion to see whether this was a general pattern, as you have told us in your evidence that the communities are too different to be properly generalized about.

A Yes. You are comparing Tuktoyaktuk and Coppermine. Is that the community? Or which communities did you have?

Q Well, you have told us that you have looked at communities in the delta in your evidence.

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A Yes.

Q You have also told us that the communities are very difficult to generalize about because even within this small area, they are very different.

A Yes. I mentioned that this morning. Fine. Yes.

Q So, what I have just read back to you about people from Tuktoyaktuk and their reactions to this employment, may not necessarily be the reactions of other communities.

A I would agree.

Q And you haven't tested any other except Coppermine?

A There is just a bit of Aklavik data in that second report also, but neither the data from Tuk nor the data from Aklavik pretended at all to be community-wide or broadly representative. The purpose of that part of the study was to take a comparative look at three categories of employees. Delta native people, Coppermine native people and southern white people; and that was what I did. So I am saying that there is a bit of Aklavik data, but I would not feel that one could extrapolate from that bit of Aklavik data to the community as a whole, and so I would agree.

Q So without this data, you couldn't say recommend to Gulf Oil that they should concentrate their recruitment program in any particular settlement because you don't have that

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data except the ones that you have told us about
Aklavik, Tuk and Coppermine.

A Yes. And Coppermine is
the only one I would really want to make very con-
fident statements about because I think I've got the
Coppermine picture rather clearly in mind -- or rather
clearly covered. I would not say that with respect to
Tuk or Aklavik.

Q All right. Having this
picture fairly clearly in mind, as you say, would
you be recommending to Gulf Oil that they concentrate
their recruitment program for these permanent jobs in
the settlement of Coppermine?

A Permanent jobs in gas
plants in the delta?

Q Yes, I should have said
the producers rather than the applicant.

A No. Because I don't
know that much about the other alternatives. That
is, I do know a fair amount about one alternative, but
in order to make a comparative recommendation I would
need to know roughly, equally well, what the other--
the characteristics of the other alternatives were --
and that I certainly don't know.

Q Fine. Assuming the
schedule that the producers have projected for their
gas ^{plant} development, I would assume we are looking at a
very short time in terms of the kinds of studies you
would like to see done before determining where
recruitment would most properly be effective and

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acceptable to the people recruited?

A Yes. I see. I guess --
I guess my approach to it might well be something else,
That is, we are -- we are talking about a relatively
few jobs in the context of a relatively large labor
pool in the delta and a fair number of the Nortran
trainees have come from other parts of the Northwest
Territories as well. In any larger population, there
is a small population who can be found who may be
reasonably happy with a certain kind of job package
involving advantages and disadvantages and so given
the small number of positions we are talking about
here, I wouldn't say that it's necessary to do a
very elaborate set of comparative studies in order to
decide from which community or communities we will
attempt to recruit gas plant operators for these few
gas plants.

Q All right. And have you
been asked to recommend to Gulf Oil or any of the
other producer applicants what proportion of the
permanent work force for the gas plants should be
recruited from the native communities?

A I have not been asked
to make any such recommendation at all.

Q But you did just say that
you would assume that it would be a small proportion
of that force?

A What I meant to be saying
is that the labor pool in the delta and the labor
pool in the Northwest Territories is a fairly large

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labor pool and, in contrast to the very few number of positions needed to staff gas plants. Within that labor pool you can find -- and the current Nortran training program -- is in one sense a screening procedure to find -- which results in identifying people who make a satisfactory adjustment and appear to be relatively happy working away from kith and kin and friends and so on. And, so, given the few people you have to recruit, I don't think it's -- there is any reason to say well, we need to do some fairly elaborate studies to find out the kinds of communities from which we should recruit this very small group.

Q So, without trying to be unfair to the Nortran program, it has two purposes. It isn't just to train native peoples to work in the oil and gas industry, it's also to act as the screening process to make sure that you get people that are suitable and people that will likely decide to take a career up in the industry.

A Yes. I didn't mean to impute that reason to it and I -- in terms of what I know about it -- I don't think it was. I think simply that the way it's operating, one of the functions -- one of the inescapable consequences of it is to separate those who adapt to the situation sufficiently well that they persist as contrasted with those who find it not their cup of tea. Those who find that it is their cup of tea, then are available and so you can't set up such a program without inadvertently accomplishing that function as it were. You don't

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have to build it up. It's intrinsic to the design, as it were.

THE COMMISSIONER:

Q How many people altogether have entered the Nortran training program since its inception, in round numbers?

A Yes. That figure, I recall, it was about 171. Let me just mention that it's been a full year since I've read through that material, so that I can't answer definitely.

THE COMMISSIONER: All right, as of a year ago 171 had entered the program. How many were employed in the oil and gas industry as of a year ago when you did your evaluation?

A The only work that I've done was in addition to this one evaluation of the Nortran program is work for Gulf, so that I don't know what the total exploration employment was and I don't recall what the Gulf figure was although that was a part of the second report. I had a total employee figure there, but I don't have that at the tip of my tongue.

MR. BALLEM: Mr. Commissioner I am advised there have been 194 in the program.

THE COMMISSIONER: Up to date?

A That's up to now, I believe. My report was as of -- I think our cut-off date on that was November 1. As of then, the 170 odd figure was quite close to right on, I think, but there have been an additional 20 in the intervening year.

Q Given that those were the

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totals, Dr. Hobart, I understand from this letter again, and I'll read from it: "The number of trainees on the Nortran program varies between 90 and 100 depending on terminations and the speed of replacement". The number you gave before was the total that have been in it, is that correct?

A Yes. I understood the Commissioner's question to be the number who had passed through the program, as contrasted with those who were in the program at any one point.

Q All right. So the figure I gave you is the number in the program at any one time?

A Right. The number of positions as against the number of men who have passed through positions or are yet in.

Q Now, your evidence has disclosed that aspirations of native people in the delta have changed in some way since the 1960's. That there are influences whether they be things like this Inquiry or the organization of native groups and the talk about land claims, etc. That may have changed aspirations, and looking at the table on page 43, table 7 in your evidence, would you say that in some ways that table is out of date? That there are some things that would go into that table, or come out of it today, to reflect the changing attitudes that you have spoken of?

A I suspect that that would be true, yes.

Q Would you care to put any

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in or take any out now just because of your experience rather than because you've conducted another survey?

A I'm afraid my response would be purely speculative and there may well be people in the audience here, whose suspicions or speculations at that point would be more accurate than mine because they are in much closer touch with the young people of the community.

Q When the study that you've referred to was done, and I believe it was done in 1967. Do we have any figures on how many young people in the age ranges represented here were not in school at the time? What percentages, for example.

A '67. Well, the data that I quote from the Honigman's are relevant at that point. But the Honigman's data, as I recall is for Inuvik alone. So, that, as I mentioned this morning, that does represent a biased set of responses because many young people had not attained to those grade levels.

Q So if you dropped out before then, you might have already had some other aspiration or lack of desire or opportunity to remain in school.

A Yes, I suspect so. I guess I would add speculatively that peer culture tends to be more important than school culture and I suspect that what we are seeing here is the impact or a reflection of peer culture at least as much as school culture and if that's so, then the responses of the drop-outs might well not be that different from the

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responses of those yet in school. But that is speculative.

THE COMMISSIONER: Well, school culture would have a great impact on peer culture anyway, wouldn't it? You can't segregate the two.

A Yes. I would buy that, surely.

THE COMMISSIONER: And, this you were talking about Mr. Derek Smith's survey.

A Right.

THE COMMISSIONER: Well, I really don't think we need to go into it. There it is. It shows what those young people -- the occupations they regarded as desirable and Dr. Hobart cited it as an example of the influence of a decade of schooling and inculcation of white values and the diminution in the eyes of the young people of the values and occupations of their own culture. It doesn't -- there isn't much more in it than that, is there?

Q No sir. I'm just interested in first of all limiting it to a period of time, if that is in fact where it should be. And also, and Dr. Hobart has already indicated this to show that it isn't an exhaustive list. There may be things to which young people in the delta aspire these days that were not included in this survey.

THE COMMISSIONER: Oh, no doubt but Dr. Hobart doesn't pretend to know anything about that, or do you?

A No.
MR. BAYLY: That's all the questions.

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Cross-Exam by Bayly
Cross-Exam by Scott
I have of Dr. Hobart. Thank you very much, sir.

A Thank you.
CROSS-EXAMINATION BY MR. SCOTT:
Q Dr. Hobart, I must have
two short questions on the understanding that you may
be back when we get into Phase Four to deal with the
generalized aspects of your overview evidence that go
beyond the problems of the delta. The two questions
I have. First, could you outline for the Commissioner
and for the record, the objectives that were set for
you or that you set for yourself in connection with
the Coppermine work for Gulf?

A Yes. I was approached by
a Gulf representative in -- when was this? -- about
July, I guess, 1973, with the request to do an impact
study of the impact of Gulf employment on Coppermine.
The thing that this official spelled out at our first
meeting was that Gulf did not know whether the impact
of the employment that they made available was bene-
ficial to the community or was perhaps detrimental.
And that if there was clear evidence that the impact
was detrimental, they were quite prepared to terminate
the program. They did not want, the official told me,
to be in a position of inadvertently inflicting
damage, disorganization, a radical disruption on a
community, and being in a sense, morally responsible.
Well, so the terms of reference then, were to discover
the impact of this employment program. What we did
then was to interview a variety of people, including --
one of the most helpful was the person who had been
settlement manager in Coppermine up until May of that year

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1 and other observers, and we sought to interview all of
2 the men who had been employed in the program at all
3 and interviewed 49 I think it was out of 53, and all
4 of their wives and we had a somewhat comparable pro-
5 portion of wives responding and we sought to interview
6 a child between the ages of 10 and 16 to get the child's
7 perspective on this. We were interested in wives and
8 children responses because it obviously did involve
9 absence of the fathers from home two weeks out of
10 three while they were away working in the delta. We
11 obtained, then, attitude data. How people felt about
12 the program. We asked questions like were they inter-
13 ested in being employed the following year. We asked
14 husbands and wives and children that, did they want the
15 men to be employed the following year. How long a
16 proportion of the employment season would they like
17 to see the father work. Were they, in terms of rotation
18 schedules, would they prefer a two week at work and
19 one week at home rotation schedule as had been practised
20 or would they prefer, for example, a three and one.
21 Three at work and one at home, where they would earn
22 more money. The attitudinal data all came out very
23 strongly positive in terms of the program. No more
24 than about 8% at most as I recall, so we are talking
25 about one or two individuals, were critical of the
26 program. Basically, people said, "yes, we miss our
27 loved ones when -- during the separation period, but
28 we definitely want the man to go back to work next
year. We want him --" Typically the response was
"we would like him to work all season, if that's possible"

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1 And, interestingly, a majority of 56% of the men as
2 I recall and about 66% of their wives said that if
3 given the choice, they would prefer a three and one
4 rotation schedule rather than a two and one rotation
5 schedule. And the reason given for these favorable
6 responses toward the program and toward the possibility
7 of working longer and working as long as possible was
8 the income the employment offered. So that as far as
9 the subjective response of the community was concerned,
10 it was quite unambiguous. There were no really serious
11 criticisms of the program at all. The objective
12 indicator data, I've already reviewed. I mentioned
13 the earnings that resulted. I mentioned liquor con-
14 sumption and drunken violence and respiratory illness
15 incidents among children and infants so that the
16 upshot of the picture was that we felt there was no
17 basis at all for suggesting that the program should be
18 terminated. The increased drunken violence picture
19 was distressing, no question, but it was not a radical
20 picture. That is, not a very large proportion of the
21 community had been beaten up in this way. And particu-
22 lary there was no pattern indicating that children were
23 suffering under this arrangement. And so, the upshot
24 of that, then, was some recommendations having to do
25 with ways in which the program might be improved. But
26 there was no suggestion at all that it should be
27 terminated and it has continued then, with some con-
28 sequences that I suggested broadly. Does that?

29 Q Well yes. Apart, Dr.
30 Hobart from trying to assess the attitude of the people

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1 Coppermine and the affects on the community of Copper-
2 mine of this work program, I take it that you also
3 went further and attempt to gauge the attitudes of the
4 project's employees co-workers and their supervisors
5 to the employees who came from Coppermine.

6 A Yes.

7 Q And would it be true to
8 say that in attempting to do that your approach was
9 the same. That is, perhaps the expression as you used,
10 an attitudinal approach. That is to say, you question
11 people about their attitudes?

12 A Yes. Let me elaborate on
13 that if I may. The first year, we talked to supervisors
14 but we did not have a formal interview schedule. It
15 was, in effect, an informal discussion with the super-
16 viors in terms of how had they found these workers and
17 what kinds of difficulties in the work situation had
18 developed that they were aware of. We did this in
19 part because we weren't sure that the workers them-
20 selves would tell us of unfortunate incidents, perhaps
21 that they were painful as far as the worker was con-
22 cerned or that sort of thing. It was in the second
23 year follow-up of this that we interviewed, using a
24 formal interview schedule, white co-workers of the
25 Coppermine employees to -- and here we were interested
26 in finding out what kind of acceptance the Coppermine
27 Inuit workers were receiving from the men whom they
28 worked along side of and some further and more specific
29 details from supervisors of the Inuit workers. So there
30 was this further attitudinal aspect that came during

1 the second year and it was -- that was a continuing
2 assessment then to draw in larger parts of the picture.

3 Q Well would it be fair to
4 say, Dr. Hobart, I've just looked at it, that it's
5 apparent that the study was cast very heavily in favor
6 of developing attitudinal responses. That that was
7 the technique that was at the heart of the program --
8 of your program?

9 A I need to elaborate more
10 broadly, I think. I was asked by Gulf to do a study
11 which would include an economic assessment of the --
12 of this Coppermine employment program. That part I
13 delegated to somebody else, so that there is a second
14 volume to that -- that second report -- which deals
15 strictly with an economic assessment of the cost of
16 employing Coppermine workers as against other categories
17 of workers.

18 Q But leaving that aside,
19 would it be correct to say that your mandate and the
20 way you carried it out was really to run an attitudinal
21 survey?

22 A Yes.

23 Q And, what I'd like to ask
24 you, is in terms of making socio-economic -- if that's
25 a word -- but in terms of making socio-economic judge-
26 ments about events, what do you say about the attitud-
27 inal survey as a technique and before you answer just
28 let me summarize something that troubles me yet. If
29 you want to know what's happening, there are two ways
30 to find out. The first of all is to go out and ask

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1 people and the second is to see if you^{can} find out some
2 other way that doesn't depend on personal responses.
3 Now I take it that your mandate really was to use the
4 first technique.

5 A Yes.

6 Q Now what do you say about
7 that in terms of helping us find out what is really
8 going on?

9 A I need to insert two
10 corrections, I think. My mandate was to find out the
11 response of Coppermine workers as best I could. And
12 I attempted to go about this in basically two ways.
13 People vote with their feet as well as with their mouths.
14 That is, they quit as a way voting and they, instead of
15 returning at the end of a week at home, they may stretch
16 the long break at home into two or three weeks. And in
17 that volume two, there are analyses of duration of
18 employment, of amounts of money earned, of interruptions
19 of the normal work cycle, so I attempted to analyze
20 in both performance data as it was reflective of the
21 response of people to the work situation, continuity,
22 discontinuity, persistence, termination and so on,
23 as well as the strictly attitudinal data of what people
24 said about the situation. The attitudinal data was
25 distinctly more favorable than the performance data if
26 you view persistence and minimal discontinuity as
27 favorable, but I think that that would be a misinterpretation, basically. I think it's quite possible for
28 people to say I think that a certain employment opportunity is great and I want it, but, in fact I'm only

1 interested in it for a couple of months or perhaps
2 three months. I'm not interested in the whole shot.
3 I'm interested in a part of that scene rather than
4 exploiting it to the full potential. So that, I think
5 that these two sets of data are complimentary, although
6 I would certainly agree that I think that the validity,
7 the truthfulness of the performance data is higher
8 than the validity of the attitudinal data because of
9 interviewer effect such as I mentioned before. Because
10 of a tendency, perhaps, for people to respond in terms
11 of what they think you want to hear. But, we did have
12 other data, other little indications, I should say,
13 which indicated that people were as positive in their
14 reactions, perhaps, as they tended frequently to say.
15 There was one man the first year, for example, who at
16 the end of a certain work period, said he was quitting,
17 he didn't want any more.' He was back two weeks later.
18 It turned out that his wife had put pressure on him to
19 get back there. So that she was favorable, if he was
20 not all that favorable, and there were other indications
21 of this sort of thing, suggestive that the employment
22 opportunity was valued.

23 Q Well, in short then, while
24 the attitudinal approach may be useful, obviously
25 essential, if you want to find out expressed attitudes
26 in determining what's really going. I put it to you
27 that you would rely on it only in so far as it is
28 consistent or supported by other data of the type you
29 have described.

A Yes, I would hate to do

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a study of this sort relying solely on attitudinal data.

Q You would more than hate to, you wouldn't want to, would you? It would be unreliable. It would run the risk of being unreliable.

A Right. Definitely.

Q All right.

A Insofar as there are discrepancies in this kind of a transitional social situation, I think one needs to -- needs to cast about -- well, I think that inconsistencies do not automatically dictate that one is right and the other is wrong in a transitional situation, I would think that one would expect a certain amount of inconsistencies, but a kind of inconsistency which I would have taken at face value, would be if the turnover rates were very high. That is, ^{if} almost nobody worked more than two work rotation periods or something of that sort.

Q Well now, bearing in mind that the study was done in a distinct community outside the delta or relating to workers coming from a distinct community outside the delta. And bearing in mind the fact that it dealt with a different kind of work, that is oil and gas exploration work as opposed to the work that may be produced by the projects in question here -- that is construction and maintenance -- to what extent do you think one is able to apply or make use of your findings when confronting and attempting to measure the impact of a proposed Mackenzie Valley pipeline?

A I'm quite confident you

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cannot automatically extract by any means. Some of the statements which Mr. Bayly read from that second Gulf report show that there were differences in that second year of the Coppermine employment experience. Differences between the performance of Coppermine workers and delta workers. It reflects the fact that the situations of the Coppermine workers were different from the situations of the delta workers. There was not the plethora of employment opportunities available in Coppermine that there are -- that there was in the delta, the backyard of the Tuk people. I think we simply have to say that we don't know the parameters very well of a more acculturated community like Tuktoyaktuk, when comparing it with a less acculturated community like Coppermine. I would expect that where we are dealing with a more Coppermine-like community and Wrigley might be such a community, for example -- that acknowledging we are moving from one ethnic group to another which would make a difference as well, that one could probably more safely extrapolate from Coppermine to Wrigley than from Coppermine to Tuktoyaktuk. But, I have to say that unfortunately there is just not the data^{base} available for making those kinds of statements very confidently. Those are speculative statements.

Q Well, would it come down to this. That bearing in mind the technique that was largely utilized and^{the} nature of the project, that you yourself would be reluctant to apply your conclusions beyond the subject matter you were asked to analyze?

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1 A Right.

2 MR. SCOTT: Those are all the
3 questions I have. Thank you Dr. Hobart.

4 A Thank you.

5 THE COMMISSIONER: Re-examination?

6 MR. BALLEM: No, thank you.

MR. BAYLY: Before we leave

7 this I noticed that Dr. Hobart had referred to an
8 economic volume of that report and I'm informed that
9 we haven't seen that and wonder if it could be made
10 available to us. And sir, I have just distributed the
11 evidence, the first evidence available, of one of my
12 panels and I don't want to confuse people to think that
13 this will necessarily dictate the chronological order
14 because of the collapse in the schedule in some ways.
15 I'll be producing it as it's available rather than in
16 the order it may be called. And I'll give you the
17 order as soon as I can. ,

(WITNESS ASIDE)

18 THE COMMISSIONER: Thank you very
19 much Dr. Hobart. I certainly have enjoyed listening
20 to you and it's been very helpful to all of us. I
21 certainly appreciate your taking the time and trouble
22 to come and give us the benefit of your experience.

23 I gather we may see you again, perhaps in Phase
24 Four at Yellowknife and we can look forward to that.
25 What is the panel for tomorrow morning Mr. Ballem?

26 MR. BALLEM: We will start
27 off, Mr. Commissioner with the panel -- the technical
28 panel if you like, for the Imperial Oil project and they
29 will be primarily engineers and design people and I
30 would envisage that technical engineering questions

1 would be directed towards them.

THE COMMISSIONER: All right.

2 And Mr. Scott, we have then to hear evidence from each
3 of the three companies on their gas development projects
4 and then we have to hear the evidence of the two
5 panels on the -- one on environmental impact of the
6 project and the other on social impact. So you might
7 confer with Mr. Bayly. He seems to have the pulling
8 oar this week and you might confer with Mr. Bayly and
9 see if an evening sitting tomorrow is called for.
10

11 MR. SCOTT: I tried that
12 yesterday, Mr. Commissioner apropos tonight but I'll
13 try it again tonight apropos of tomorrow.

14 MR BALLEM: I might add Mr.
15 Commissioner we also I believe, will have a policy
16 panel at the end of that.

17 MR. COMMISSIONER: Well let's
18 see if we can't try to proceed on the assumption
19 that we would get through the producers evidence this
20 week, sitting until Saturday. That is until Saturday
21 at 5. And get through an awful lot of Mr. Bayly's
22 evidence next week, enabling us to come to Arctic
23 Gas's evidence on the cross delta route when we return
24 here for our second two week session. All right,
25 well we will adjourn until 9:30.

26 (PROCEEDINGS ADJOURNED TO JANUARY 22, 1976)
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